DOCUMENT RESUME

ED 044 296 SE 010 041

TITLE	Resource Conservation Glossary.
INSTITUTION	Soil Conservation Society of America, Ankeny, Iowa.
PUB DATE	70
NOTE	54p.
AVAILABLE FROM	Soil Conservation Society of America, 7515 Northeast Ankeny Rd., Ankeny, Iowa 50021 ($5.00)
EDRS PRICE	EDRS Price MF-$0.25 HC Not Available from EDRS.
DESCRIPTORS	Agronomy, Biology, *Conservation Education, Earth Science, Ecology, *Environment, *Environmental Education, *Glossaries, Natural Resources, *Reference Materials

ABSTRACT

This glossary is a composite of terms selected from 13 technologies, and is the expanded revision of the original 1952 edition of "The Soil and Water Conservation Glossary." The terms were selected from these areas: agronomy, biology, conservation, ecology, economics, engineering, forestry, geology, hydrology, range, recreation, soils, and watersheds. Definitions vary in length from one to five or more sentences, and are intended to serve as a reference for professionals and laymen as well as students. (PR)

ED0 44296

SE 010 041

Resource Conservation Glossary

Soil Conservation Society of America

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

Resource Conservation Glossary

Published in 1970 by the
Soil Conservation Society of America
7515 Northeast Ankeny Road
Ankeny, Iowa 50021

Price $5

ED0 44296

Preface

The *Soil and Water Conservation Glossary*, first published in 1952, was used extensively. It did not cover the broad resource conservation field, however, and has since outlived its usefulness. The committee that produced it recognized that "a revision will surely be needed within a few years to bring the contents up to date and to correct any fallacies in the present works." The Council of the Society was also aware of the need for such a revision and in 1964 established a small committee to undertake this work. In 1967 Robert Eikleberry and D.E. Hutchinson of the Lincoln, Nebraska Chapter requested that the job of revising the glossary be referred to the chapter. The Council approved the request. After determining that the original glossary would not only be revised but expanded, the chapter's glossary committee selected 13 technologies that were to be included – agronomy, biology, conservation, ecology, economics, engineering, forestry, geology, hydrology, range, recreation, soils, and watersheds. Each was assigned to a subchairman, who, with the help of a subcommittee within the chapter, determined what terms and definitions were to be included. Each subchairman also solicited reviews of the terms in his particular technology from individuals throughout the United States. Once completed, the various technologies were integrated into this composite *Resource Conservation Glossary* which is intended to serve as a reference for professionals and laymen as well as students.

D. E. Hutchinson
A. D. Stoesz
Cochairmen

Glossary Committee

D. E. Hutchinson, *cochairman*
A. D. Stoesz, *cochairman*
Charles V. Bohart
James W. Carr
James V. Drew
Robert W. Eikleberry
Arthur E. Ferber
Allen L. Fisk
Wade H. Hamor
William A. Hayes
Arnold Heerwagen
Peter N. Jensen
Herbert L. Kollmorgen
Richard D. Leisher
Robert J. Lemaire
Donald E. Milford
Ben O. Osborn
Ervin O. Peterson
Oliver J. Scherer
Thomas N. Shiflet
James D. Simpson
Norris P. Swanson
Robert I. Turner
Kenneth R. Voss
Grant Woodward

ED047456

Reviewers

The names of all contributors are not known. The following made contributions and reviewed the draft of a particular technology:

J. W. Adair
W. E. Adams
L. B. Adkinson
P. F. Allan
M. D. Atkins
Maurice Baker
L. J. Bartelli
A. J. Baur
W. D. Bennet
O. W. Bidwell
S. G. Boone
C. S. Britt
R. H. Brownscomb
R. E. Burwell
L. V. Compton
E. J. Core
A. H. Cratty
Darrell Davis
V. E. Davison
L. E. Derr
R. I. Dideriksen
O. W. Dillion
C. E. Domingo
W. W. Donnan
J. F. Douglass
H. R. Duke
C. B. England
A. W. Epp
T. E. Fenton
W. R. Frandsen
E. C. Ford
C. L. Godfrey
H. R. Haise
H. F. Heady
W. O. Hofstad
T. B. Hutchings
S. H. Jessee
L. E. Johnson
R. W. Johnson
J. R. Johnston
E. G. Knox
E. G. Kruse
H. L. Leithead
Gary Long
L. D. Marriage
R. P. Matelski
A.P. Mazurak
T. M. McCalla
W. E. McKinzie
A.C. Orvedal
Lloyd Partain
Charles Phillips
C. T. Prout, Jr.
R. A. Read
F. F. Riecken
Paul Rudolf
E. C. A. Runge
Irvin Sealander
V. W. Shally
Minott Silliman, Jr.
R. E. Taylor
T. J. Thiel
O. P. Thiemann
D. R. Vallicott
H. B. Vanderford
C. A. Van Doren
E. P. Whiteside
W. C. Whitman
R. E. Williams
H. D. Wittmuss
L. L. Yarlett

Soil Conservation Service watershed and engineering planning units, Lincoln, Nebraska; Portland, Oregon; Fort Worth, Texas; and Upper Darby, Pennsylvania. Soil Conservation Service engineering division, Washington, D. C. Soil Conservation Service foresters.

References

Allard, R. W. 1960. Principles of plant breeding. John Wiley and Sons, Inc., New York, N. Y.

American Geological Institute. 1960. Glossary of geology and related sciences (second edition, 1962). Washington, D. C.

American Society for Testing and Materials. Standard definitions of terms and symbols relating to soil mechanics. D653-64; 1965 book of ASTM standards, part II, pages 279-296. Philadelphia, Pennsylvania.

American Society of Agricultural Engineers. 1967. Glossary, soil and water terms. Special Publication SP-04-67. St. Joseph, Michigan.

American Society of Range Management. 1964. A glossary of terms used in range management. Portland, Oregon.

Billings, W. D. 1964. Plant and the ecosystem. Wadsworth Publishing Company, Belmont, California.

Bureau of the Census. Glossary, Missouri River Basin comprehensive framework study. Washington, D. C.

Carpenter, J. R. 1956. An ecological glossary. Hafner Publishing Company, New York, N. Y.

Colorado Science Society. 1955. Proceedings, volume 16.

Dayton, W. A. 1931. Glossary of botanical terms commonly used in range research. USDA Miscellaneous Publication. Washington, D. C.

Geological Society of America. Bulletin, volume 59.

Hanson, H. C. 1962. Dictionary of ecology. Philosophical Library, New York, N. Y.

Heady, Harold F. 1964. Palatability of herbage and animal preference. Journal of Range Management.

Society of American Foresters. 1958. Forest terminology, a glossary of terms used in forestry (third edition). Washington, D. C.

Soil Conservation Service. Engineering handbooks. Washington, D. C.

Soil Conservation Service. Engineering memorandums. Washington, D. C.

Soil Conservation Service. 1961. Land capability classification. Agriculture Handbook 210. Washington, D. C.

Soil Conservation Service. 1967. Field book – timekeeping and progress system codes. Washington, D. C.

Soil Conservation Society of America. 1952. Soil and water conservation glossary. Journal of Soil and Water Conservation 7 (1,2,3): 41-52, 93-104, 144-156.

Soil Science Society of America. 1965. Glossary of soil science terms. Soil Science Society of America Proceedings 29: 330-351

Soil Survey Staff, U.S. Department of Agriculture. 1951. Soil survey manual. USDA Handbook 18. Washington, D. C.

Stokes and Jarnes. Glossary of selected geologic terms.

U. S. Department of Agriculture. 1938. Soils and men, yearbook of agriculture. Washington, D. C.

U. S. Department of Agriculture. 1957. Yearbook of agriculture. Washington, D. C. pages 751-770.

U. S. Department of Agriculture. Major land resource regions. USDA Handbook 296. Washington, D. C.

For more comprehensive definitions and discussions of soils and related items, such as new names and definitions, see the following:

Johnson, William M. 1963. The pedon and the polypedon. Soil Science Society of America Proceedings 27: 212-215.

Smith, Guy D. 1963. Objectives and basic assumptions of the new soil classification system. Soil Science 96: 6-16.

Soil Survey Staff, Soil Conservation Service. 1960. Soil classification, a comprehensive system, 7th approximation. Washington, D. C.

Soil Survey Staff, Soil Conservation Service. 1967. Supplement to soil classification system, 7th approximation. Washington, D. C.

Soil Survey Staff, Soil Conservation Service. 1968. Supplement to soil classification system, 7th approximation, Histosols. Washington, D. C.

A horizon – See soil horizon.

AASHO classification (soil engineering) – The official classification of soil materials and soil aggregate mixtures for highway construction used by the American Association of State Highway Officials.

ABC soil – A soil with a distinctly developed profile, including A, B, and C horizons. See diagnostic horizons; soil horizons.

abrasion – The wearing away by friction, the chief agents being currents of water or wind laden with sand and other rock debris and glaciers.

abrasion test – A test made on rock materials to determine their resistance to wear during construction operations or their suitability for riprap. The Los Angeles abrasion test (ASTM No. C 131) involves tumbling the dry material in a cylindrical drum with 1 7/8-inch diameter steel balls for 500 or 1,000 revolutions. The material that breaks down to smaller than No. 12 sieve size is considered the weight loss. The Deval abrasion test (ASTM No. D289) uses a similar machine but requires 10,000 revolutions.

absorption loss (irrigation) – The initial loss of water from a canal or reservoir by wetting of the soil at the time water is first turned into the structure.

accelerated erosion – See erosion.

access road – A road or vehicular travelway constructed to provide needed access.

accretion – The gradual addition of new land to old by the deposition of sediment carried by the water of a stream.

acidity, active – The activity of hydrogen ion in the aqueous phase of a soil, measured and expressed as a pH value.

acidity, free – The titratable acidity in the aqueous phase of a soil, expressed in milliequivalents per unit mass of soil or in other suitable units.

acidity, potential – The amount of exchangeable hydrogen ion in a soil that can be rendered free or active in the soil solution by cation exchange, usually expressed in milliequivalents per unit mass of soil.

acid soil – A soil with a preponderance of hydrogen ions, and probably of aluminum in proportion to hydroxyl ions. Specifically, soil with a pH value less than 7.0. For most practical purposes, a soil with a pH value less than 6.6. The pH values obtained vary greatly with the method used; consequently, there is no unanimous agreement on what constitutes an acid soil. The term is usually applied to the surface layer or to the root zone unless specified otherwise.

acre-foot – The volume of water that will cover 1 acre to a depth of 1 foot.

acre-inch – The volume of water that will cover 1 acre to a depth of 1 inch.

AC soil – A soil having a profile containing A and C horizons with no clearly developed B horizon.

active fault – A fault that has undergone movement in recent geologic time (the last 10,000 years) and may be subject to future movement.

actual use (range) – The actual grazing use of a grazing unit, usually expressed as animal months or animal unit months.

adequate-size farm – A farm with enough resources and productivity to generate enough income to (1) provide an acceptable level of family living, (2) pay current operating expenses, (3) pay interest on loans, and (4) allow for capital growth to keep in step with technological growth.

adhesion – Molecular attraction which holds the surfaces of two substances in contact, that is, water and rock particles.

aeolian soil material (obsolete) – See eolian soil material.

aeration, zone of – The zone between the land surface and the water table.

aeration, soil – The process by which air in the soil is replenished by air from the atmosphere. In a well-aerated soil the soil air is similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen. The rate of aeration depends largely on the volume and continuity of pores in the soil.

aerial photograph – A photograph of the earth's surface taken from airborne equipment, sometimes called aerial photo or air photograph.

aerobic – **1**: Having molecular oxygen as a part of the environment. **2**: Growing only in the presence of molecular oxygen, as aerobic organisms. **3**: Occurring only in the presence of molecular oxygen (said of certain chemical or biochemical processes, such as aerobic decomposition).

afforestation – The artificial establishment of forest crops by planting or sowing on land that has not previously, or not recently, grown tree crops.

aftermath – The regrowth of forage crops after harvesting.

aggradation – The process of building up a surface by deposition. This is a long-term or geologic trend in sedimentation.

aggregation, soil – The cementing or binding together of several soil particles into a secondary unit, aggregate, or granule. Water-stable aggregates, which will not disintegrate easily, are of special importance to soil structure.

agribusiness – The sum of all operations involved in the production, storage, processing, and wholesale marketing of agricultural products.

agricultural economics – The application of economic principles to the agribusiness sector of the economy.

agricultural ladder – An expression used to describe the classic path to farm ownership, that is, working as a hired hand, acquiring equity in livestock and equipment, renting a farm, buying a farm and finally owning an unencumbered farm.

agricultural land – Land in farms regularly used for agricultural production. The term includes all land devoted to crop or livestock enterprises, for example, the farmstead lands, drainage and irrigation ditches, water supply, cropland, and grazing land of every kind in farms.

agronomic practices – The soil and crop activities employed in the production of farm crops, such as selecting seed, seedbed preparation, fertilizing, liming, manuring, seeding, cultivation, harvesting, curing, crop sequence, crop rotations, cover crops, stripcropping, pasture development, etc.

air porosity – The proportion of the bulk volume of soil that is filled with air at any given time or under a given condition, such as a specified moisture condition. Commonly considered to be the larger pores, that is, those filled with air when the soil is at field capacity. Sometimes called noncapillary pore space when determined as the bulk volume of pores that are unable to hold water when subjected to a tension of 60 centimeters of water.

air valve – A device to admit or release air from a pipeline automatically without permitting loss of water.

Alfisols – See soil classification.

alkali – In chemistry, any substance having marked basic properties in contradistinction with acid, that is, being capable of furnishing to its solution or other substances the hydroxyl ion (OH negative). The important alkali metals are sodium and potassium. In a less scientific sense the term is applied to the soluble salts, especially the sulfates and chlorides of sodium, potassium, and magnesium and the carbonates of sodium and potassium, which are present in some soils of arid and semiarid regions in sufficient quantities to be detrimental to ordinary agriculture.

alkaline – An adjective applied to an alkali; opposite of acidic.

alkaline soil – Generally, a soil that is alkaline throughout most or all of the parts of it occupied by plant roots, although the term is commonly applied to only the surface layer or horizon of a soil. Precisely, any soil horizon having a pH value greater than 7.0; practically, a soil having a pH above 7.3.

alkali soil – 1: A soil with a high degree of alkalinity (pH of 8.5 or higher) or with a high exchangeable sodium content (15 percent or more of the exchange capacity) or both. 2: A soil that contains sufficient alkali (sodium) to interfere with the growth of most crop plants. See saline-alkali soil; sodic soil.

alkalinity – The quality or state of being alkaline. The concentration of OH negative ions.

alluvial – Pertaining to material that is transported and deposited by running water.

alluvial fan – A sloping, fan-shaped mass of sediment deposited by a stream where it emerges from an upland onto a plain.

alluvial land – Areas of unconsolidated alluvium, generally stratified and varying widely in texture, recently deposited by streams, and subject to frequent flooding. A miscellaneous land type.

Alluvial soils – An azonal great soil group of soils, developed from transported and relatively recently deposited material (alluvium) characterized by a weak modification (or none) of the original material by soil-forming processes.

alluvium – A general term for all detrital material deposited or in transit by streams, including gravel, sand, silt, clay, and all variations and mixtures of these. Unless otherwise noted, alluvium is unconsolidated.

Alpine Meadow soils – A great soil group of the intrazonal order, comprised of dark soils of grassy meadows at altitudes above the timberline.

ammonification – The biochemical process whereby ammoniacal nitrogen is released from nitrogen-containing organic compounds.

ammonium fixation – The adsorption or absorption of ammonium ions by the mineral or organic fractions of the soil in a manner that they are relatively insoluble in water and relatively unexchangeable by the usual methods of cation exchange.

amortization – To repay a debt in a sequence of equal payments. Part of each payment is used to pay the interest due at the time it is made, and the balance is applied to the reduction of the principal.

anaerobic – 1: The absence of molecular oxygen. 2: Growing in the absence of molecular oxygen (such as anaerobic bacteria). 3: Occurring in the absence of molecular oxygen (as a biochemical process).

analog computer – A computer that represents variables by physical analogies, using mechnical or electrical equivalent circuits as an analog for physical phenomenon, such as flow, temperature, etc.

Ando soils – A zonal group of dark colored soils high in organic matter developed in volcanic ash deposits.

angle of repose – Angle between the horizontal and the maximum slope that a soil assumes through natural processes.

animal unit – A measure of livestock numbers based on the equivalent of a mature cow (approximately 1,000 pounds live weight). An animal unit is roughly one cow, one horse, one mule, five sheep, five swine, or six goats.

animal unit conversion factor – A numerical figure that allows conversion from one kind or class of animal to another.

animal unit month – A measure of forage or feed requirement to maintain one animal unit for a period of 30 days. Abbr. A.U.M.

anion – Negatively charged ion; ion which during electrolysis is attracted to the anode.

annual flood – The highest peak discharge in a water year.

annual plant – A plant that completes its life cycle and dies in 1 year or less.

annuity – A series of equal payments made at equal intervals of time.

antecedent moisture – See antecedent soil water.

antecedent soil water – Degree of wetness of the soil prior to irrigation or at the beginning of a runoff period, expressed as an index or as total inches soil water.

Ap – The surface layer of a soil disturbed by cultivation or pasturing.

apparent specific gravity – Ratio of the mass of oven-dry soil to the mass of an equal volume of water.

application efficiency – See water application efficiency.

application rate – Rate that material is applied to a given area.

appropriated rights, water – See water rights.

apron – A floor or lining to protect a surface from erosion, for example, the pavement below chutes, spillways, or at the toes of dams.

aquifer – A geologic formation or structure that transmits water in sufficient quantity to supply the needs for a water development. The term water-bearing is sometimes used synonymously with aquifer when a stratum furnishes water for a specific use. Aquifers are usually saturated sands, gravel, fractures, cavernous and vesicular rock.

arable land – Areas of land so located that production of cultivated crops is economical and practical.

arch dam – Curved masonry or concrete dam, convex upstream, that depends on arch action for its stability. The load is transferred by the arch to abutments.

area curve (channel hydraulics) – Commonly used to describe a plotting of stage or elevation versus cross-sectional area. (reservoir) – A plotting of stage or elevation versus the associated water surface area.

area, natural – 1: An area set aside indefinitely to preserve a representative unit of a major forest, range, or wetland type primarily for the purposes of science, research, or education. 2: A site or area in its natural state undisturbed by man's activities.

argillic horizon – See diagnostic horizons.

argillan – See clay film.

arid – A term applied to regions or climates that lack sufficient moisture for crop production without irrigation. The limits of precipitation vary considerably according to temperature conditions, with an upper annual limit for cool regions of 10 inches or less and for tropical regions as much as 15 to 20 inches. Contrast with semiarid.

Aridisols – See soil classification.

artesian water – Water confined under enough pressure to cause it to rise above the level where it is encountered in drilling. Flowing artesian wells are produced when the pressure is sufficient to force the water above the land surface.

aspect (forestry) – The direction that a slope faces.

assessed value – The value placed on property for taxation purposes.

associated costs – A term commonly used in water resource development projects. These costs include the value of goods and services needed over and above project costs to make the immediate products or services of a project available for use or sale.

atom – The smallest portion of an element that can take part in a chemical reaction.

Atterberg limits – Atterberg limits are measured for soil materials passing the No. 40 sieve.

Shrinkage Limit – (SL) The shrinkage limit is the maximum water content at which a reduction in water content will not cause a decrease in the volume of the soil mass. This defines the arbitrary limit between the solid and semisolid states.

Plastic Limit (PL) – The plastic limit is the water content corresponding to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

Liquid Limit (LL) – The liquid limit is the water content corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil.

Plasticity Index (PI) – The plasticity index is the numerical difference between the liquid limit and plastic limit.

Shrinkage Index (SI) – The shrinkage index is the numerical difference between the plastic and shrinkage limits.

attitude of bedrock – A general term describing the relation of some directional features to a rock in a horizontal surface.

autecology – A study of the individual, or members of a species collectively, in relation to environmental conditions.

automated system (irrigation) – An irrigation system using timers or self propulsion to reduce labor requirements in the application of irrigation water.

automatic system pumping – A system whereby the pumping unit starts and stops automatically in response to an automatic control, such as a float switch.

auxiliary spillway – A dam spillway built to carry runoff in excess of that carried by the principal spillway.

available forage – Forage that is accessible for animal consumption.

available nutrient – That portion of any element or compound in the soil that readily can be absorbed and assimilated by growing plants. Not to be confused with "exchangeable."

available water – The portion of water in a soil that can be absorbed by plant roots, usually considered to be that water held in the soil against a tension of up to approximately 15 bars. See field capacity.

available water-holding capacity (soils) – The capacity to store water available for use by plants, usually expressed in linear depths of water per unit depth of soil. Commonly defined as the difference between the percentage of soil water at field capacity and the percentage at wilting point. This difference multiplied by the bulk density and divided by 100 gives a value in surface inches of water per inch depth of soil. See field capacity; wilting point.

B horizon – See soil horizon.

backfire – A fire started intentionally ahead of an advancing fire to remove flammable material by controlled burning and thus stop or control the main fire.

bacteria – Microscopic, single-celled or noncellular plants, usually saprophytic or parasitic.

badland – A land type consisting of steep or very steep barren land, usually broken by an intricate maze of narrow ravines, sharp crests, and pinnacles resulting from serious erosion of soft geologic materials. Most common in arid or semiarid regions. A miscellaneous land type.

baffles – Vanes, guides, grids, grating, or similar devices placed in a conduit to deflect or regulate flow and effect a more uniform distribution of velocities.

band – Any number of sheep or goats handled as a single unit under range conditions, usually considered synonymous with herd.

band seeding – Seeding of grasses and legumes in a row 1 to 2 inches directly above a band of fertilizer.

bank storage – Water absorbed by the bed and banks of a stream, reservoir, or channel and returned in whole or in part as the water level falls.

basal area (forestry) – The area of the cross section at breast height of a single tree or of all the trees in a stand, usually expressed in square feet. This may be measured inside or outside the bark, usually the latter. (range) – The area of ground surface covered by the stem or stems of a range plant, usually measured 1 inch above the soil in contrast to the full spread of the foliage.

base exchange capacity (obsolete) – See cation exchange capacity.

base flow – The stream discharge from groundwater runoff.

base level – The theoretical limit toward which erosion constantly tends to reduce the land. Sea level is the general base level, but in the reduction of the land there may be many temporary base levels which, for the time being, the streams cannot reduce. These temporary base levels may be controlled by the level of a lake or river into which the stream flows or by a particularly resistant stratum of rock that the stream has difficulty in removing.

base period – A period of time from which comparisons of other time periods are made, normally used with reference to price, population, production, etc. Similar to bench mark.

base saturation percentage – The ratio of bases (calcium, magnesium, potassium, and sodium) extracted from the soil by an extraction agent to the capacity of the soil to hold extractable bases, expressed as a percentage. The capacity of the soil to hold extractable bases is dependent on the method of measurement – larger values are obtained as the pH of the soil solution increases.

basic crops – Crops such as corn, wheat, and cotton, that are most important in the agricultural economy due to acreage, value, or climate.

basic facilities (recreation) – Fundamental improvements needed for the enjoyment and use of an area.

basin (hydrology) – The area drained by a river. (irrigation) – A level plot or field, surrounded by dikes, which may be flood irrigated.

basin irrigation – A method of irrigation in which a level or nearly level area surrounded by an earth ridge or dike is flooded with water.

basin lister – See lister.

batter-board – One of a series of horizontal boards set across or to one side of a trench line to indicate a desired level of reference grade from which ditch or trench elevations are determined.

bedding – 1: Method of surface drainage consisting of narrow-width plowlands in which the dead furrows run parallel to the prevailing land slope and are used as field drains. Also known as crowning or ridging. 2: The process of laying a drain or other conduit in its trench and tamping earth around the conduit to form its bed. The manner of bedding may be specified to conform to the earth load and conduit strength. 3: The arrangement of sediment and sedimentary rock in layers, strata, or beds more than 1 centimeter thick. See lamination. 4: Method of preparing seedbeds for row crop culture, also used for irrigation or drainage.

bed ground – An area where animals sleep and rest.

bedload – The sediment that moves by sliding, rolling, or bounding on or very near the streambed; sediment moved mainly by tractive or gravitational forces or both but at velocities less than the surrounding flow.

bedrock – The more or less solid rock in place either on or beneath the surface of the earth. It may be soft or hard and have a smooth or irregular surface.

bench flume – Flume built on constructed benches or terraces along hillsides or around mountain slopes when the ground is too rough or too steep to permit the use of an excavated canal.

bench mark (economics) – Data for a specific time period that is used as a base for comparative purposes with comparable data. (engineering) – A point of reference in elevation surveys.

bench terrace – See terrace.

bentonite – A highly plastic clay consisting of the minerals montmorillonite and beidellite that swells extensively when wet.

berm – A shelf that breaks the continuity of a slope.

biennial plant – A plant that requires 2 years to complete its life cycle.

biomass – The amount of living matter in a given area.

biome – A major biotic unit consisting of plant and animal communities having similarities in form and environmental conditions.

biota – The flora and fauna of a region.

biotic influence – The influence of animals and plants on associated plant or animal life as contrasted with climatic influences and edaphic (soil) influences.

biotype – A group of individuals occurring in nature, all with essentially the same genetic constitution. A species usually consists of many biotypes.

blaze – A mark made on a tree by cutting a piece of bark.

blind – Placement of loose soil around a tile or conduit to prevent damage or misalignment when the trench is backfilled. Allows water to flow more freely to the tile.

blind drain – A type of drain consisting of an excavated trench refilled with previous materials, such as coarse sand, gravel or crushed stones, through whose voids water percolates and flows toward an outlet. Often referred to as a French drain because of its initial development and widespread use in France.

blinding material – Material placed on top of and around a closed drain to improve the flow of water to the drain and to prevent displacement during back-filling of the trench.

blind inlet – Inlet to a drain in which entrance of water is by percolation rather than open flow channels.

blocky soil structure – See soil structure types.

blowout – 1: An excavation in areas of loose soil, usually sand, produced by wind. 2: A break through or rupture of a soil surface attributable to hydraulic pressure, usually associated with sand boils.

board foot – A unit of measure of the wood in lumber, logs, bolts, or trees; it is the amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before surfacing or other finishing. Abbr. bd. ft.

Bog soil – A great soil group of the intrazonal order and hydromorphic suborder, including muck and peat, developed under swamp or marsh types of vegetation, mostly in a humid or subhumid climate.

border (wildlife) – A strip of low-growing vegetation, herbaceous or woody, usually more than 10 feet wide, established along the edges of fields, woodlands, or streams.

border dikes – Earth ridges built to guide or hold irrigation water within prescribed limits in a field; a small levee.

border ditch – Ditch used as a border of an irrigated strip or plot, water being spread from one or both sides of the ditch along its entire length.

border irrigation – A surface method of irrigation by flooding between border dikes.

border strip (irrigation) – The area of land bounded by two border ridges or dikes that guide the irrigation stream from the point or points of application to the end of the strips. Cross slope between ridges or dikes is usually eliminated.

brackish – Slightly salty. Term applied to water with a saline content that is intermediate between that of streams and sea water; neither fresh nor salty but in between.

break grade – To change grade, as in a tile line, ditch, or field.

breccia – A rock consisting of consolidated granular rock fragments larger than sand grains.

broad-base terrace – See terrace.

broadcast seeding – Scattering seed on the surface of the soil. Contrast with drill seeding which places the seed in rows in the soil.

broad-crested weir – An overflow structure for measuring water, often rectangular in cross section, in which the water adheres to the surface of the crest rather than springing clear. Contrast with sharp-crested weir.

Brown Forest soils – A great soil group of the intrazonal order and calcimorphic suborder formed on calcium-rich parent materials under deciduous forest and possessing a high base status but lacking a pronounced illuvial horizon, developed under the deciduous forest in temperate humid regions from parent material relatively rich in bases. A much more narrow group than the European Brown Forest or Braunerde.

Brown Podzolic soils – A zonal great soil group similar to Podzols but lacking distinct A2 horizon characteristic of the Podzol group, developed under deciduous or mixed deciduous and coniferous forest in temperate o cool-temperate humid regions. Some American soil taxonomists prefer to class this soil as a kind of Podzol and not as a distinct great soil group.

Brown soils – A great soil group of the temperate to cool arid regions, composed of soils with a brown surface and a light-colored transitional subsurface horizon over calcium carbonate accumulation.

browse – Twigs or shoots, with or without attached leaves, of shrubs, trees, or woody vines available as forage for domestic and wild browsing animals.

browse line – The line on woody plants marking the height to which browsing animals have removed browse.

Brunizem (Prairie) soils – The zonal group of soils having a very dark brown or grayish brown surface horizon, grading through brown soil to the lighter colored parent material at 2 to 5 feet, developed under tall grasses in a temperate, relatively humid climate. These include only those dark-colored soils of the treeless plains in which carbonates have not been concentrated in any part of the profile by soil-forming processes.

brush – A growth of shrubs or small trees.

brush control – Suppressing of brush to reduce its competition with more desirable species.

brush matting – 1: A matting of branches placed on badly eroded land to conserve moisture and reduce erosion while trees or other vegetative cover is being established. 2: A matting of mesh wire and brush used to retard streambank erosion.

buffer species (wildlife) – A nongame species that serves as food for predators and thus relieves predation on a game species.

buffer strips – Strips of grass or other erosion-resisting vegetation between or below cultivated strips or fields.

bulk density, soil – The mass of dry soil per unit bulk volume. The bulk volume is determined before drying to constant weight at 105 degrees centigrade. A unit of measure, usually grams per cubic centimeter or pounds per square foot.

bulk specific gravity – The ratio of the bulk density of a soil to the mass of unit volume of water.

bulk volume – The volume, including the solids and the pores, of an arbitrary soil mass.

bunchgrass – A grass that does not have rhizomes or stolons and forms a bunch or tuft.

buyers market – A market situation in which the supply (availability of goods and services) is high in relation to demand.

C horizon – See soil horizons.

calcareous soil – Soil containing sufficient calcium carbonate (often with magnesium carbonate) to effervesce visibly when treated with cold 0.1 normal hydrochloric acid.

calcic horizon – See diagnostic horizons.

calf crop – The number of calves produced by a given number of cows, usually expressed in percent of calves weaned of cows bred.

caliche – 1: A layer near the surface, more or less cemented by secondary carbonates of calcium or magnesium precipitated from the soil solution. It may occur as a soft, thin soil horizon, as a hard, thick bed just beneath the solum, or as a surface layer exposed by erosion. Not a geologic deposit. 2: Alluvium cemented with sodium nitrate, chloride, and/or other soluble salts in the nitrate deposits of Chile and Peru. See hard pan.

California bearing ratio (soils engineering) – The load-supporting capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio and multiplied by 100. First standardized in California. Abbr. CBR. A soil with a CBR of 16 will support 16 percent of the load that would be supported by the standard crushed limestone per unit area and with the same degree of distortion.

cambic horizon – See diagnostic horizons.

camping site – An area of land used for tent, trailer, or other camping vehicle or pack camping, including transient camping.

canal (irrigation) – Constructed open channel for transporting water from the source of supply to the point of distribution.

canopy – The cover of leaves and branches formed by the tops or crowns of plants.

capability, land – See land capability.

capacity curve, pump – A graph showing the relationship of pump speed, discharge, pumping and friction head, and efficiency for a specific pump. Syn. head-capacity curve.

capillary fringe – A zone just above the water table (zero gauge pressure) that remains almost saturated. The extent and the degree of definition of the capillary fringe depends upon the size distribution of pores.

capillary porosity – The small pores or the bulk volume of small pores that hold water in soils against a tension usually greater than 60 centimeters of water. These pores are commonly filled with water when the soil is at field capacity.

capillary water – The water held in the "capillary" or small pores of a soil, usually with tension greater that 60 centimeters of water. Much of this water is considered to be readily available to plants.

capital – All the durable and nondurable items used in production.

capital goods – Tangible economic goods, other than land, that are used in production.

capitalized cost – The first cost of an asset plus the present value of all renewals expected within the planning horizon.

capital recovery period – The period of time required for the net returns from an outlay of capital to equal the investment.

carbonaceous – Pertaining to or containing carbon derived from plant and animal residues.

carbon cycle – The sequence of transformation undergone by carbon utilized by organisms wherein it is used by one organism, later liberated upon the death and decomposition of the organism, and returned to its original state to be reused by another organism.

carbon-nitrogen ratio – The ratio of the weight of organic carbon to the weight of total nitrogen in the soil or in organic material, obtained by dividing the percentage of organic carbon (C) by the percentage of total nitrogen (N).

carrying capacity (recreation) – The amount of use a recreation area can sustain without deterioration in its quality. (wildlife) – The maximum number of animals an area can support during a given period of the year. See grazing capacity.

cash-grain farm – A farm on which corn, sorghums, small grains, soybeans or field beans, and peas account for at least

50 percent of the value of farm products sold.

catch crop – 1: A crop produced incidental to the main crop of the farm and usually occupying the land for a short period. 2: A crop grown to replace a main crop which has failed.

catena – A sequence of soils of about the same age, derived from similar parent material and occurring under similar climatic conditions but having different characteristics due to variation in relief and in natural drainage.

cation – Positively charged ion; ion which, during electrolysis, is attracted to the cathode. Common soil cations are calcium, magnesium, sodium, potassium, and hydrogen.

cation exchange – The interchange between a cation in solution and another cation on the surface of any surface-active material, such as clay colloid or organic colloid.

cation-exchange capacity – The sum total of exchangeable cations that a soil can adsorb (sometimes called total-exchange capacity, base-exchange capacity, or cation-adsorption capacity), expressed in milliequivalents per 100 grams of soil or of other adsorbing material, such as clay.

cattle walkway – An earth fill or embankment constructed on marsh range or range areas subject to overflow.

caveat emptor – A Latin phrase meaning "let the buyer beware."

caveat venditor – A Latin phrase meaning "let the seller beware."

Census of Agriculture – A census taken by the Bureau of Census every 5 years. It includes number of farms, land in farms, crop acreage and production, livestock numbers and production, farm spending, farm facilities and equipment, farm tenure, value of farm products sold, farm size, etc. Data are given for states and counties.

centrifugal pump – A device that converts mechanical energy to pressure or kinetic energy in a fluid by imparting centrifugal force on the fluid through a rapidly rotating impeller.

chalk – Composed mainly of the calcareous shells of various marine microorganisms, but the matrix consists of fine particles of calcium carbonate, some of which may have been chemically precipitated.

channel – A natural stream that conveys water; a ditch or channel excavated for the flow of water.

channel improvement – The improvement of the flow characteristics of a channel by clearing, excavation, realignment, lining, or other means in order to increase its capacity. Sometimes used to connote channel stabilization.

channel stabilization – Erosion prevention and stabilization of velocity distribution in a channel using jetties, drops, revetments, vegetation, and other measures.

channel storage – Water temporarily stored in channels while enroute to an outlet.

channery – An adjective incorporated into the soil textural class designations of horizons when the soil mass contains between 15 and 90 percent by volume of fragments. See fragment as defined under coarse fragments. In Scotland and Ireland the term may refer to gravel.

chaparral – A brush community composed of evergreen, sclerophyllous species.

check (hydraulics, irrigation) – A structure, permanent or portable, designed to raise or control the water surface in a channel or ditch.

check dam – Small dam constructed in a gully or other small watercourse to decrease the streamflow velocity, minimize channel scour, and promote deposition of sediment.

check irrigation – A method of irrigation in which an area is practically or entirely surrounded by earth ridges.

Chernozem soils – A zonal great soil group consisting of soils with a thick, nearly black or black, organic-matter-rich A horizon, high in exchangeable calcium, underlain by a lighter colored transitional horizon that is above a zone of calcium carbonate assumulation. These soils occur in a cool subhumid climate under a vegetation of tall and midgrass prairie.

cherty – An adjective incorporated into the soil textural class designations of horizons when the soil mass contains between 15 and 90 percent by volume of chert fragments. See chert fragments and coarse chert fragments as defined under coarse fragments.

Chestnut soils – A zonal great soil group consisting of soils with a moderately thick, dark brown A horizon over a lighter colored horizon that is above a zone of calcium carbonate accumulation.

chiseling – Breaking or loosening the soil, without inversion, with a chisel cultivator or chisel plow.

chroma – The relative purity, strength, or saturation of a color; directly related to the dominance of the determining wavelength of the light and inversely related to grayness; one of the three variables of color. See Munsell color system; hue; value.

chute – A high-velocity, open channel for conveying water to a lower level without erosion.

Cipolletti weir – A trapezoidal weir with one to four side slopes. See measuring weir.

circulation road (recreation) – A vehicular travelway within a recreation area.

classification – The assignment of objects or units to groups within a system or categories distinguished by their properties or characteristics.

class of animal – Age and/or sex group of a kind of animal, for example, cows, calves, yearlings, ewes, does, fawns, etc.

clastic – Composed of broken fragments of rocks and minerals.

clay (soils) – 1: A mineral soil separate consisting of particles less than 0.002 millimeter is equivalent diameter. 2: A soil textural class. 3: (engineering) A fine-grained soil that has a high plasticity index in relation to the liquid limits.

clayey – See particle size classes for family groupings.

clayey-skeletal – See particle size classes for family groupings.

clay film – A thin coating of well-oriented clay particles on the surface of a soil aggregate, particle, or pore. Syn. clay coat, clay skin, argillans, tonhautchen.

clay mineral – 1: Naturally occuring inorganic crystalline material composed of fragments of hydrous aluminum silicate minerals found in soils and other earthy deposits, the particles being of clay size, that is, less than 0.002 millimeter in diameter. 2: Material as heretofore described but not limited by particle size.

claypan – A dense, compact layer in the subsoil having a much higher clay content than the overlying material from which it is separated by a sharply defined boundary; formed by downward movement of clay or by synthesis of clay in place during soil formation. Claypans are usually hard when dry and plastic and sticky when wet. They usually impede the movement of water and air. With adequate fertility they often do not impede plant roots. See hardpan.

clean tillage – Cultivation of a field so as to cover all plant residues and to prevent the growth of all vegetation except the particular crop desired.

clearcutting (forestry) – A method of cutting that removes the entire timber stand on the area cut. Contrast with selective cutting.

cleavage – The splitting or tendency to split along crystallographic planes of minerals. As applied to rocks, it is the property of splitting into thin parallel sheets which may be highly inclined to the bedding planes, as in slate.

climate – The sum total of all atmospheric or meterorological influences, principally temperature, moisture, wind, pressure, and evaporation, which combine to characterize a region and give it individuality by influencing the nature of its land forms, soils, vegetation, and land use. Contrast with weather.

climate, continental – The type of climate characteristic of land areas separated from the moderating influence of oceans by distance, direction, or mountain barriers, marked by relatively large daily and seasonal change in temperature.

climate, oceanic – The type of climate characteristic of land areas near oceans which contribute to the humidity and at the same time have a moderating influence on temperature and range of temperature variation. Syn. marine climate.

climatic year – A continuous 12-month period arbitrarily selected for the analysis and presentation of climatological or streamflow data, generally beginning March 1 or April 1. See water year.

climax vegetation – Relatively stable vegetation in equilibrium with its environment and with good reproduction of the dominant plants.

clod – A compact, coherent mass of soil ranging in size from 5 to 10 millimeters (.2 to .4 inches) to as much as 200 to 250 millimeters (8 to 10 inches); produced artifically, usually by the activity of many by plowing, digging, etc., especially when these operations are performed on soils that are either too wet or too dry for normal tillage operations.

clone – A group of plants derived by asexual reproduction from a single parent plant. Such plants are therefore, of the same genetic constitution.

closed drain – Subsurface drain, tile, or perforated pipe that receives surface water through surface inlets.

coarse cherty – Similar to cherty but fragments are coarse chert in size. See coarse fragments.

coarse fragments – Rock or mineral particles greater than 2.0 millimeters in diameter. See Table 1 for the names used for coarse fragments in soils.

coarse-loamy – See particle size classes for family groupings.

coarse sand – See soil separates; soil texture.

coarse sandy loam – See soil texture.

coarse-silty – See particle size classes for family groupings.

coarse texture – The texture exhibited by sands and loamy sands. A soil containing large quantities of these textural classes (United States usage). See sand; sandy; moderately coarse texture.

cobblestone – See coarse fragments.

cobbly – An adjective incorporated into the soil textural class descriptions of horizons when the soil mass contains between 15 and 90 percent by volume of cobblestones. See cobblestone as defined under coarse fragments.

COBOL – Common Business-Oriented Language; a computer language used to prepare a program for business data processing.

coefficient of roughness – See roughness coefficient.

coefficient of variation or variability (statistics) – The standard deviation expressed as a fraction of the mean or a percentage.

cohesion – Holding together; force holding a solid or liquid

Table I. Names applied to coarse fragments in soils.

Fragments		Descriptive terms applied to fragments that have:		
Shape	Material	Diameters less than 3 inches	Diameters from 3 to 10 inches	Diameters more than 10 inches
rounded or sub-rounded	all kinds of rock	pebble	cobblestone	stone[1]
irregular and angular	chert	chert fragment	coarse chert fragment	stone[1]
	other than chert	angular pebble	angular cobblestone	stone[1]
		Lengths up to 6 inches	Lengths from 6 to 15 inches	Lengths over 15 inches
thin and flat	limestone, sandstone, or schist	fragment	flagstone	stone
	slate	slate fragment	flagstone	stone
	shale	shale fragment	flagstone	stone

---

[1] Bouldery is sometimes used when stones are larger than 24 inches.

together, owing to attraction between like molecules. Decreases with rise in temperature.

COLE – coefficient of linear extensibility; the ratio of the difference between the moist and dry lengths of a clod to its dry length; (Lm-Ld)/Ld, wherein Lm is the moist length (at 1/3 bar) and Ld is the air-dry length. The measurement correlates with the volume change of a soil upon wetting and drying.

colloid – A substance that, when apparently dissolved in water, diffuses not at all or very slowly through a semipermeable membrane and usually has little effect on freezing point, boiling point, or osmotic pressure of the solution; a substance in a state of fine subdivision with particles from .00001 to .0000001 centimeter.

colloid, soil – Collid refers to organic or inorganic matter having very small particle size and a correspondingly large surface area per unit of mass. Most colloidal particles are too small to be seen with the ordinary compound microscope.

colluvial (geology) – Consisting of alluvium in part and also containing angular fragments of the original rock. Also talus and cliff debris; material of avalanches.

colluvial soil material – Soil material that has moved down hill and has accumulated on lower slopes and/or at the bottom of the hill. Colluvial material is moved downhill by the force of gravity and to some extent by frost action and local wash. Syn. colluvium. See soil creep.

color – See Munsell color system.

columnar soil structure – See soil structure types.

common use – Grazing use by more than one kind of animal, either at the same time or at different times within the same growing season.

community – An aggregation of organisms within a specified area.

compaction – To unite firmly; the act or process of becoming compact, usually applied in geology to the changing of loose sediments into hard, firm rock. With respect to construction work with soils, engineering compaction is any process by which the soil grains are rearranged to decrease void space and bring them into closer contact with one another, thereby increasing the weight of solid material per cubic foot.

comparative advantage – Producers at each locality tend to use their resources to produce those goods which they can produce at the lowest relative costs and use the proceeds from these goods to purchase those goods produced under greater advantage elsewhere.

competition – The general struggle for existence within a trophic level in which the living organisms compete for a limited supply of the necessities of life.

compost – Organic residues or a mixture of organic residues and soil that have been piled and allowed to undergo biological decomposition.

compound interest – The process of adding interest to the principle sum of money at stated intervals and computing interest for the next interval of time on the new principal.

comprehensive plan – A plan for the development of an area including policies, goals, and interrelated plans for private and public land use, transportation systems, community facilities, and all other elements and features that in composite, represent the decisions of local people.

compression – A system of forces or stresses that tends to decrease the volume or compact a substance or the change of volume produced by such a system of forces.

concentrates – Feed with high total digestible nutrient and low fiber content, for example, grain and grain by-products.

concretion (soils) – A local concentration of a chemical compound, such as calcium carbonate or iron oxide, in the form of an aggregate or nodule of varying size, shape, hardness, and color.

conduit – Any channel intended for the conveyance of water, whether open or closed.

cone of depression – Depression, roughly conical in shape, produced in a water table or piezometric surface by the extraction of water from a well.

conglomerate – The consolidated equivalent of gravel.

conifer – A tree belonging to the order *Coniferae*, usually evergreen, with cones and needle-shaped or scale-like leaves and producing wood known commercially as "soft wood."

conjunctive water use – The joining together of two sources of irrigation water, such as groundwater and surface water, to serve a particular piece of land.

conservation – The protection, improvement, and use of natural resources according to principles that will assure their highest economic or social benefits.

conservation district – A public organization created under state enabling law as a special-purpose district to develop and carry out a program of soil, water, and related resource conservation, use, and development within its boundaries, usually a subdivision of state government with a local governing body and always with limited authorities. Often called a soil conservation district or a soil and water conservation district.

conservation plan for farm, ranch, or nonagricultural land unit – The properly recorded decisions of the cooperating landowner or operator on how he plans, within practical limits, to use his land in an operating unit within its capability and to treat it according to its needs for maintenance or improvement of the soil, water, and plant resources.

consistence (soil) – 1: The resistance of a material to deformation or rupture. 2: The degree of cohesion or adhesion of the soil mass. Terms used for describing consistence of soil materials at various soil moisture contents and degrees of cementation are:

- **wet** – nonsticky, slightly sticky, sticky, very sticky, nonplastic, slightly plastic, plastic, and very plastic.
- **moist** – loose, very friable, friable, firm, very firm, and extremely firm.
- **dry** – loose, soft, slightly hard, hard, very hard, and extremely hard.
- **cementation** – weakly cemented, strongly cemented, and indurated.

consolidate – Any or all of the processes whereby loose, soft, or liquid earth materials become firm and hard.

consumers (biology) – Heterotrophic organisms, chiefly animals, that ingest other organisms or particle organic matter.

consumptive use – The quantity of water used and transpired by vegetation plus that evaporated. See evapotranspiration.

contamination – The act of polluting or making impure, used here to indicate chemical, sediment, or bacteriological impurities.

continuous delivery (irrigation) – A system by which an irrigator receives his allotted quantity of water at a continuous rate throughout the irrigation season.

continuous grazing – Allowing domestic livestock to graze a specific area throughout the grazing season. Not necessarily synonymous with year-long grazing.

contour – **1**: An imaginary line on the surface of the earth connecting points of the same elevation. **2**: A line drawn on a map connecting points of the same elevation.

contour ditch – Irrigation ditch laid out approximately on the contour.

contour farming – Conducting field operations, such as plowing, planting, cultivating and harvesting, on the contour.

contour flooding – Method of irrigating by flooding from contour ditches.

contour furrows – Furrows plowed approximately on the contour on pasture or rangeland to prevent soil loss and increase infiltration. Also, furrows laid out approximately on the contour for irrigation purposes.

contour interval – The vertical distance between contour lines.

contour stripcropping – Layout of crops in comparatively narrow strips in which the farming operations are performed approximately on the contour. Usually strips of grass, close-growing crops, or fallow are alternated with those in cultivated crops.

contrasting textures (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – If two widely different particle size classes occur within a vertical distance of 5 inches in the control section from which the soil family is derived, both particle size classes are listed in the name. For example, if the upper part of the control section is loamy sand and the lower part is clay, the particle size class is sandy over clayey.

control – In research, something under study, either untreated or given a standard treatment, which is used as a standard for comparison or checking the results of other treatments.

control section (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – Arbitrary depths of soil material within which certain diagnostic horizons, features, and other characteristics are used as differentiae in the classification of soils. The thickness is specific for each characteristic being considered but may be different for different characteristics.

control structure – A regulating structure to maintain water at a desired elevation, usually installed in gravity flow systems.

controlled burning – The deliberate use of fire where the burning is restricted to a predetermined area and intensity. Syn. prescribed burning.

conveyance loss – Loss of water from delivery systems during conveyance, including operational losses and losses due to seepage, evaporation, and transpiration by plants growing in or near the channel.

cool-season plant – A plant that makes its major growth during the cool portion of the year, primarily in the spring but in some localities in the winter.

cord – A unit of measurement of stacked wood containing 128 cubic feet within its outside surfaces. The standard cord is a pile of wood 4 feet by 8 feet, made up of sticks 4 feet long.

core trench – Excavation for a core wall in the construction of an earth embankment.

core wall – Wall of masonry, sheet piling, or compacted earth placed near the center of a dam or embankment to reduce seepage.

corrasion – The wearing away of earth materials through the cutting, scraping, scratching, and scouring effects of solid material carried in the currents of water or air.

correlation (soil) – See soil correlation.

correlation (statistics) – An expression indicating the degree of association or mutual relationship between the value of two attributes, not necessarily a casual or dependent relationship.

correction strip – An irregular strip or area of land lying between contour strips.

corrosion – The solution of rocks and other materials by chemical action.

corrugation irrigation – A partial surface flooding method of irrigation, normally used with drilled crops, where water is applied in small graded channels or furrows so spaced that an adequate lateral spread is obtained by the time the desired amount of water has entered the soil.

cost allocation – The process of apportioning cost among the various purposes served by a measure or work of improvement.

  alternate cost – Cost of providing the same or equivalent benefits from the most likely economically feasible alternative source available in the area to be served.

  joint cost – The difference between the cost of a multiple-purpose development as a whole and the total of the separable costs for all project purposes.

  separable cost – The difference between the cost of a multiple-purpose development and the cost of the development with the purpose omitted.

  specific cost – That cost incurred solely for a single purpose, for example, a pipeline to carry municipal water.

cover crop – A close-growing crop grown primarily for the purpose of protecting and improving soil between periods of regular crop production or between trees and vines in orchards and vineyards.

cover, ground – Any vegetation producing a protecting mat on or just above the soil surface. In forestry, low-growing shrubs, vines, and herbaceous plants under the trees.

cover, vegetative – All plants of all sizes and species found on an area, irrespective of whether they have forage or other value. Syn. plant cover.

cover (wildlife) – Plants or objects used by wild animals for nesting, rearing of young, resting, escape from predators, or protection from adverse environmental conditions.

cow month – The grazing needed to maintain a mature cow in good condition for 30 days.

cradle (engineering) – A supporting structure shaped to fit the conduit it supports.

creep (soil) – Slow mass movement of soil and soil material down relatively steep slopes, primarily under the influence of gravity but facilitated by saturation with water and by alternate freezing and thawing.

crest – **1**: The top of a dam, dike, spillway, or weir, frequently restricted to the overflow portion. **2**: The summit of a wave or peak of a flood.

crib dam – A barrier of timber forming bays or cells that are filled with stone or other heavy material. See rock-fill dam.

critical depth (hydraulics) – Depth of flow in a channel of specified dimensions at which specific energy is a minimum for a given discharge.

critical slope (soils) – See angle of repose. (hydraulics) That slope which will sustain a given discharge at uniform, critical depth in a given channel.

critical velocity – Velocity at which a given discharge changes from tranquil to rapid flow; that velocity in open channels for which the specific energy (sum of the depth and velocity head) is a minimum for a given discharge.

cropland – Land used primarily for the production of adapted cultivated, close-growing, fruit, or nut crops for harvest, alone or in association with sod crops.

crop residue – The portion of a plant or crop left in the field after harvest.

crop residue management – Use of that portion of the plant or crop left in the field after harvest for protection or improvement of the soil.

crop rotation – The growing of different crops in recurring succession on the same land.

crop tree – An individual tree which, because of species, form, and condition, is selected for and is most likely to be present in the final harvestable crop, usually for sawlog purposes. Contrast with weed tree; wolf tree.

crown (forestry) – The upper part of a tree, including the branches and foliage.

crown class – All trees in a stand with tops or crowns occupying a similar position in the canopy or crown cover. Crown classes usually distinguished are:

- **dominant** – Trees with crowns extending above the general level of the forest canopy and receiving full light from above and partly from the side; larger than the average tree in the stand and with crowns well developed but possibly somewhat crowded on the sides.
- **codominant** – Trees with crowns forming the general upper level of the forest canopy with the dominants receiving full light from above but comparatively little from the sides; usually with medium-sized crowns more or less crowded on the sides.
- **intermediate** – Trees with crowns below but still extending into the general level of the forest canopy, receiving a little direct light from above but none from the sides; usually with small crowns and stem diameter considerably crowded on the sides.
- **overtopped** – Trees with crowns entirely below the general forest canopy and receiving no direct light either from above or from the sides. Syn. suppressed.

crown cover – The canopy formed by the crowns of all the trees in a forest.

cruise (forestry) – A survey of forest land to locate and estimate the timber by volume, species, size classes, products, grades, and other characteristics. Also, the estimate obtained in such a survey.

crumb structure – See soil structure type.

crust – A dry surface layer on soils that is much more compact, hard, and brittle than the material immediately beneath it.

cubic foot per second – Rate of fluid flow at which 1 cubic foot of fluid passes a measuring point in 1 second. Abbr. cfs. Syn. Second-foot; CUSEC.

cumulative infiltration – Summation of the depth of water absorbed by a soil in a specified elapsed time in reference to the time of initial water application. Syn. intake.

current meter (hydraulics) – An instrument used for measuring the velocity of flowing water. The velocity of the water is proportional to the revolutions per unit time of the propeller, vane, or wheel of the meter.

custom work – Specific farm operations performed under agreement between the farmer and the contractor, for example, custom harvesting of grain, spraying and picking fruit, and shearing sheep. The contractor furnishes labor, equipment, and materials to complete the operation.

cut – Portion of land surface or area from which earth has been removed or will be removed by excavation; the depth below original ground surface to excavated surface.

cut-and-fill – Process of earth moving by excavating part of an area and using the excavated material for adjacent embankments or fill areas.

cutoff – 1: Wall, collar, or other structure, such as a trench, filled with relatively impervious material intended to reduce seepage of water through porous strata. 2: In river hydraulics, the new and shorter channel formed either naturally or artifically when a stream cuts through the neck of a band.

cutting cycle – The planned interval between major cutting operations in a managed woodland tract.

cutoff drain – See interceptor drain.

cut-over forest – A forest in which most or all of the merchantable timber has been cut. Syn. logged-over.

dam – A barrier to confine or raise water for storage or diversion, to create a hydraulic head, to prevent gully erosion, or for retention of soil, rock, or other debris.

Darcy's law – A volume of water passing through a porous medium in unit time is proportional to the cross-sectional area and to the difference in hydraulic head and inversely proportional to the thickness of the medium. The proportionality constant is called the hydraulic conductivity.

dead furrow – Double furrow left between two areas or lands due to plowing in opposite directions.

debris – A term applied to the loose material arising from the disintegration of rocks and vegetative material; transportable by streams, ice, or floods.

debris dam – A barrier built across a stream channel to retain rock, sand, gravel, silt, or other material.

debris guard – Screen or grate at the intake of a channel, drainage, or pump structure for the purpose of stopping debris.

deciduous plant – A plant that sheds all its leaves every year at a certain season.

decomposer – An organism, usually a bacterium or a fungus, that breaks down the bodies or parts of dead plants and animals into simpler compounds.

decreaser plant species – Plant species in the original vegetation that will decrease in relative amount with continued overuse, often termed decreasers.

deep percolation – Water that percolates below the root zone and cannot be used by plants.

deferred grazing – Discontinuance of grazing livestock on an area for a specified period of time during the growing season to promote plant reproduction, establishment of new plants, or restoration of vigor by old plants.

deferred-rotation grazing – A systematic rotation of deferred grazing.

deficiency – The amount by which a series of quantities falls short of a given demand, normal, or other criterion; opposite of excess.

deflocculate – 1: To separate the individual components of compound particles by chemical and/or physical means. 2: To cause the particles of the disperse phase of a colloidal system to become suspended in the dispersion medium.

deformation of rocks – Any change in the original form or volume of rock masses produced by tectonic forces; folding, faulting, and solid flow are common modes of deformation.

degradation – To wear down by erosion, especially through stream action.

Degraded Chernozem – A zonal great soil group consisting of soils with a very dark brown or black A1 horizon underlain by a dark gray, weakly expressed A2 horizon and a brown B(?) horizon, formed in the forest-prairie transition of cool climates.

degree of grazing – The degree of utilization of selected plant species in a designated area at the time of measurement.

delivery box – Structure diverting water from a canal to a farm unit, often including measuring devices. Syn. turnout.

delta – An alluvial deposit formed where a stream or river drops its sediment load on entering a body of more quiet water, formed largely beneath the water surface and in an area often resembling the shape of the Greek letter Delta, with the point of entry of the stream at one corner.

demand – The quantity of any particular commodity that will be purchased on a market or groups of related markets at a given price or series of prices.

demand system of irrigation – System of irrigation water delivery where each irrigator may request irrigation water in the amount needed and at the time desired.

demography – The statistical study of human vital statistics and population dynamics.

demonstration area – An area of land with definite boundaries and of sufficient size on which demonstrational work in soil and water conservation and land use was done by and and between the Soil Conservation Service and cooperating landowners and owners and operators. Project areas were designated by name and number by SCS soon after its creation in 1935.

denitrification – The biochemical reduction of nitrate or nitrite to gaseous nitrogen, either as molecular nitrogen or as an oxide of nitrogen.

density – Number of organisms per unit at a given time.

depletion curve (hydraulics) – A graphical representation of water depletion from storage-stream channels, surface soil, and groundwater. A depletion curve can be drawn for base flow, direct runoff, or total flow. Syn. recession curve.

deposit – Material left in a new position by a natural transporting agent, such as water, wind, ice, or gravity, or by the activity of man.

deposition – The accumulation of material dropped because of a slackening movement of the transporting agent – water or wind.

depreciation – The loss in trading value resulting from a period of use or ownership.

depth, effective soil – The depth of soil material that plant roots can penetrate readily to obtain water and plant nutrients. It is the depth to a layer that differs sufficiently from the overlying material in physical or chemical properties to prevent or seriously retard the growth of roots.

desalinization – Removal of salts from saline soil, usually by leaching.

desert – An area of land that has an arid, hot to cool climate with vegetation that is sparse and usually shrubby.

Desert soils – A zonal great soil group consisting of soils with a very thin, light-colored surface horizon that may be vesicular and is ordinarily underlain by calcareous material formed in arid regions under sparse shrub vegetation.

desiccation – A drying out of material.

desilting area – An area of grass, shrubs, or other vegetation used for inducing deposition of silt and other debris from flowing water, located above a stock tank, pond, field, or other area needing protection from sediment accumulation. See filter strip.

detachment – The removal of transportable fragments of soil material from a soil mass by an eroding agent, usually falling raindrops, running water, or wind. Through detachment, soil particles or aggregates are made ready for transport — soil erosion.

detention dam – A dam constructed for the purpose of temporary storage of streamflow or surface runoff and for releasing the stored water at controlled rates.

detrital – Clastic. Rock and minerals occurring in sedimentary rocks that were derived from pre-existing igneous, sedimentary, or metamorphic rocks.

detritus – Matter worn from rocks by mechanical means, alluvial deposits generally.

development plan (recreation) – A detailed construction plan including drawings and specifications.

deviation, standard (statistics) – A measure of the average variation of a series of observations or items of a population about their mean. In normally distributed sets of moderate size the interval of the mean plus or minus the standard deviation includes about two-thirds of the items.

diagnostic horizons (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – Combinations of specific soil characteristics that are indicative of certain classes of soils. Those which occur at the soil surface are called epipedons, those below the surface, diagnostic subsurface horizons.

- **argillic horizon** – A subsurface horizon into which clay has moved. It has about 20 percent more clay than the horizons above. The presence of clay films on ped surfaces and in soil pores is evidence of clay movement.
- **calcic horizon** – A subsurface horizon more than 6 inches thick that has more than 15 percent calcium carbonate equivalent and at least 5 percent more carbonates than the C horizon.
- **cambic horizon** – A subsurface horizon that has textures finer than loamy fine sand and in which materials have been altered or removed but not accumulated. Evidences of alteration include the elimination of fine stratifications; changes caused by wetness, such as gray colors and mottling; redistribution of carbonates; and yellower or redder colors than in the underlying horizons.
- **duripan** – A subsurface horizon that is cemented by silica.
- **fragipan** – See fragipan in alphabetical listing.
- **histic epipedon** – A surface horizon that is saturated with water at some season unless artifically drained, generally

between 8 and 12 inches thick and containing from 20 to 30 percent organic matter if not plowed or from 14 to 28 percent organic matter if plowed. In each case the limiting organic-matter content depends on the amount of the mineral portion that is clay. The lower percentage is used if the horizon has no clay and the higher percentage if the horizon has 50 percent or more clay.

mollic epipedon – A surface horizon that is dark colored, contains more than 1 percent organic matter, and is generally more than 7 inches thick. It has more than 50 percent base saturation and is not both hard and massive when dry. Dark colors have Munsell values darker than 3.5 when moist and 5.5 when dry and Munsell chromas of less that 3.5 when moist and have common soil color names, such as black, very dark brown, very dark gray, or very dark grayish brown.

natric horizon – A subsurface horizon that is a special kind of argillic horizon, containing much exchangeable sodium.

ochric epipedon – A surface horizon that is too light in color (higher value or chroma than mollic epipedon), too low in organic matter, or too thin to be either a mollic or an umbric epipedon.

oxic horizon – A subsurface horizon that is a mixture principally of kaolin, hydrated iron and aluminum oxides, quartz, and other highly insoluble primary minerals and containing very little water dispersible clay.

petrocalcic horizon – An indurated subsurface horizon cemented by carbonates.

spodic horizon – A subsurface horizon in which amorphous materials consisting of organic matter plus compounds of aluminum and usually iron have accumulated.

umbric epipedon – A surface horizon similar to a mollic epipedon but having less than 50 percent base saturation.

diameter breast high – The diameter of a tree 4.5 feet above average ground level. Abbr. DBH. The additional abbreviations ob and ib are used to designate whether the diameter refers to the measurement outside or inside the bark.

dibble – A tool for opening holes for planting seeds or small seedlings. Syn. planting bar, spud, planting iron.

differential settlement – Has reference to deformation of maximum extent in a short horizontal distance.

digital computer – Type of electronic computer that performs arithmetical operations upon discrete numbers in a defined sequence.

dike (engineering)– An embankment to confine or control water, especially one built along the banks of a river to prevent overflow of lowlands; a levee. (geology) A tabular body of igneous rock that cuts across the structure of adjacent rocks or cuts massive rocks.

discharge (hydraulics) – Rate of flow, specifically fluid flow; a volume of fluid passing a point per unit time, commonly expressed as cubic feet per second, million gallons per day, gallons per minute, or cubic meters per second.

discharge coefficient (hydraulics) – The ratio of actual rate of flow to the theoretical rate of flow through orifices, weirs, or other hydraulic structures.

discharge formula (hydraulics) – A formula to calculate rate of flow of fluid in a conduit or through an opening. For steady flow discharge, Q=AV, wherein Q is rate of flow, A is cross-sectional area and V is mean velocity. Common units are cubic feet per second, square feet, and feet per second, respectively. To calculate the mean velocity, V, for uniform flow in pipes or open channels, see Manning's formula.

discounting – Determining the present value of future income or payments.

disintegration – The reduction of rock to smaller pieces mainly by mechanical means. Also used to include chemical changes.

disperse – 1: To break up compound particles, such as aggregates, into the individual component particles 2: To distribute or suspend fine particles, such as clay, in or throughout a dispersion medium, such as water.

dispersion – The act of dispersing; to separate, spread, scatter. That which is dispersed could be open textured and porous. On the other hand, colloidal particles may be dispersed and held in suspension in a fluid state as a gel and to move with the mass as a mud flow.

dispersion medium – The portion of a colloidal system in which the disperse phase is distributed.

dispersion ratio – The ratio of silt plus clay remaining in suspension after limited shaking and settling, using specific procedure, to the total silt plus clay as determined by mechanical analysis. The greater this ratio, the more easily the soil can be dispersed.

dispersion, soil – The breaking down of soil aggregates into individual particles, resulting in single-grain structure. Ease of dispersion is an important factor influencing the erodibility of soils. Generally speaking, the more easily dispersed the soil, the more erodible it is.

disposal field – Area used for spreading liquid effluent for separation of wastes from water, degradation of impurities, and improvement of drainage waters. Syn. infiltration field.

dissolved solids – The total dissolved mineral constituents of water.

distributary – Smaller conduit taking water from a canal for delivery to farms; any system of secondary conduits; river channel flowing away from the main stream and not rejoining it, as contrasted to a tributary.

distribution system (irrigation) – 1: System of ditches and their appurtenances which convey irrigation water from the main canal to the farm units. 2: Any system that distributes water within a farm.

diversion – Channel constructed across the slope for the purpose of intercepting surface runoff; changing the accustomed course of all or part of a stream. See terrace.

diversion dam – A barrier built to divert part or all of the water from a stream into a different course.

diversion terrace – Diversions, which differ from terraces in that they consist of individually designed channels across a hillside, may be used to protect bottomland from hillside runoff or may be needed above a terrace system for protection against runoff from an unterraced area. They may also divert water out of active gullies, protect farm building from runoff, reduce the number of waterways, and are sometimes used in connection with stripcropping to shorten the length of slope so that the strips can effectively control erosion. See terrace.

dominant species – Species of a community which are controlling and often the most abundant.

drain – 1: A buried pipe or other conduit (closed drain). 2: A ditch (open drain) for carrying off surplus surface water or groundwater.

drain – 1: To provide channels, such as open ditches or closed drains, so that excess water can be removed by surface flow or by internal flow. 2: To lose water (from the soil) by percolation.

drainage – 1: The removal of excess surface water or groundwater from land by means of surface or subsurface drains. 2: Soil characteristics that affect natural drainage.

drainage district – A cooperative, self-governing public corporation created under state law to finance, construct, operate, and maintain a drainage system involving a group of land holdings.

drainage, soil – As a natural condition of the soil, soil drainage refers to the frequency and duration of periods when the soil is free of saturation; for example, in well-drained soils the water is removed readily but not rapidly; in poorly drained soils the root zone is waterlogged for long periods unless artifically drained, and the roots of ordinary crop plants cannot get enough oxygen; in excessively drained soils the water is removed so completely that most crop plants suffer from lack of water. Strictly speaking, excessively drained soils are a result of excessive runoff due to steep slopes or low available waterholding capacity due to small amounts of silt and clay in the soil material.

drawdown – Lowering of the water surface (in open channel flow), water table, or piezometric surface (in groundwater flow) resulting from a withdrawal of water.

drift fence – A fence without closure used to influence animal movement.

drift, glacial – Rock debris transported by glaciers and deposited either directly from the ice or from the meltwater. The debris may or may not be heterogenous.

drill seeding – Planting seed with a drill in relatively narrow rows, generally less than a foot apart. Contrast with broadcast seeding.

drop-inlet spillway – Overfall structure in which the water drops through a vertical riser connected to a discharge conduit.

drop spillway – Overfall structure in which the water drops over a vertical wall onto an apron at a lower elevation.

drop structure – A structure for dropping water to a lower level and dissipating its surplus energy; a fall. A drop may be vertical or inclined. Syn. drop.

dryland farming – The practice of crop production in low rainfall areas without irrigation.

dry weight (soils) – The weight of the solid soil particles after all the water has been vaporized by heating to 105 degrees centigrade.

duckfoot – An implement with horizontally spreading, V-shaped tillage blades or sweeps which are normally adjusted to provide shallow cultivation without turning over the surface soil or burying surface crop residues.

duff – The more or less firm organic layer on top of mineral soil, consisting of fallen vegetative matter in the process of decomposition, including everything from pure humus below to the litter on the surface. Duff is a general, nonspecific term.

dugout pond – An excavated pond as contrasted with a pond formed by constructing a dam.

duration curve (hydraulics) – A graphical representation of the number of times given flows are equalled or exceeded during a certain period of record.

duripan – See diagnostic horizons.

dust mulch – A loose, finely granular or powdery condition on the surface of the soil, usually produced by shallow cultivation when the soil is dry.

earth dam – Dam constructed of compacted soil materials.

ecological niche – The role of an organism in an ecosystem.

ecology – The study of the interrelationships of organisms to one another and to the environment.

econometrics – The application of quantitative analysis to economic theory that has been formulated in mathematical terms.

economic growth – An increase in a nation's or an area's capacity to produce and the actual production of such goods and services.

ecosystem – Energy-driven complex of a community of organisms and its controlling environment.

ecotone – A transition line or strip of vegetation between two communities, having characteristics of both kinds of neighboring vegetation as well as characteristics of its own.

ecotype – A locally adapted population of a species which has a distinctive limit of tolerance to environmental factors. See biotype.

edge (wildlife) – The transitional zone where one cover type ends and another begins.

effective precipitation – That portion of total precipitation that becomes available for plant growth. It does not include precipitation lost to deep percolation below the root zone or to surface runoff.

effective rainfall – See effective precipitation.

effective size – 1: The maximum diameter of the smallest 10 percent of the particles of a sediment. 2: The average diameter of irregular-shaped particles.

effluent – 1: The discharge or outflow of water from ground or sub-surface storage. 2: The fluids discharged from domestic, industrial, and municipal waste collection systems or treatment facilities.

effluent water – That which flows out of the ground; a spring.

elasticity of demand – The rate at which the demand for a good changes with a change in price; the slope of the demand curve.

elevated ditch (irrigation) – Earth-fill, constructed to specifications similar to those for earth-fill dams, to provide normal grade as a substitute for flumes or siphons. Syn. raised ditch.

electrolysis – Chemical decomposition of certain substances by an electric current passing through a substance.

eluvial horizon – A soil horizon formed by the process of eluviation. See eluviation; illuvial horizon.

eluviation – The removal of soil material in suspension (or in solution) from a layer or layers of a soil. (Usually, the loss of material in solution is described by the term "leaching".) See illuviation; leaching.

emergency spillway – A spillway used to carry runoff exceeding a given design flood.

emigration – The movement of an organism out of a locality, usually without the probability of returning.

enclosure – An area fenced to confine animals.

endemic species – Restricted to a relatively small geographic area or to an unusual or rare type of habitat.

Entisols – See soil classifications.

entrance head – The head required to cause flow into a conduit or other structure, including both entrance loss and velocity head.

environment – The sum total of all the external conditions that may act upon an organism or community to influence its development or existence.

eolian – A term applied to deposits arranged or transported by the wind.

eolian soil material – Soil material accumulated through wind action. The most extensive areas in the United States are silty deposits (loess), but large areas of sandy deposits also occur.

ephemeral stream – A stream or portion of a stream that flows only in direct response to precipitation. It receives little or no water from springs and no long continued supply from snow or other sources. Its channel is at all times above the water table.

epipedon – See diagnostic horizons.

erodible (geology and soils) – Susceptible to erosion.

erosion – 1: The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. 2: Detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different types of water erosion:

accelerated erosion – Erosion much more rapid than normal, natural, or geologic erosion, primarily as a result of the influence of the activities of man or, in some cases, of other animals or natural catastrophies that expose base surfaces, for example, fires.

geological erosion – The normal or natural erosion caused by geological processes acting over long geologic periods and resulting in the wearing away of mountains, the building up of floodplains, coastal plains, etc. Syn. natural erosion.

gully erosion – The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from 1 to 2 feet to as much as 75 to 100 feet.

natural erosion – Wearing away of the earth's surface by water, ice, or other natural agents under natural environmental conditions of climate, vegetation, etc., undisturbed by man. Syn. geological erosion.

normal erosion – The gradual erosion of land used by man which does not greatly exceed natural erosion. See natural erosion.

rill erosion – An erosion process in which numerous small channels only several inches deep are formed; occurs mainly on recently cultivated soils. See rill.

sheet erosion – The removal of a fairly uniform layer of soil from the land surface by runoff water.

splash erosion – The spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may or may not be subsequently removed by surface runoff.

erosion classes (soil survey) – A grouping of erosion conditions based on the degree of erosion or on characteristic patterns. Applied to accelerated erosion, not to normal, natural, or geological erosion. Four erosion classes are recognized for water erosion and three for wind erosion. Specific definitions for each vary somewhat from one climatic zone or major soil group to another. For details see Soil Survey Staff, U.S. Department of Agriculture. 1951. *Soil survey manual*. USDA Handbook 18. U. S. Government Printing Office, Washington, D.C.

erosive – Refers to wind or water having sufficient velocity to cause erosion. Not to be confused with erodible as a quality of soil.

escarpment – A steep face or a ridge of high land; the escarpment of a mountain range is generally on that side nearest the sea.

esker – A narrow ridge of gravelly or sandy drift deposited by a stream in association with glacier ice.

essential element (plant nutrition) – A chemical element required for the normal growth of plants.

eutrophication – A means of aging of lakes whereby aquatic plants are abundant and waters are deficient in oxygen. The process is usually accelerated by enrichment of waters with surface runoff containing nitrogen and phosphorus.

evaporation – The process by which a liquid is changed to a vapor or gas.

evaporities – Sediments deposited from an aqueous (water) solution as a result of extensive or total evaporation of a solvent, such as salts in Great Salt Lake.

evapotranspiration – Water transpired by vegetation plus that evaporated from the soil. Syn. consumptive use.

excessive precipitation – Standard U.S. Weather Bureau term for "rainfall in which the rate of fall is greater than certain adopted limits, chosen with regard to the normal precipitation (excluding snow) of a given place or area." Not the same as excess rainfall.

excess rainfall – Direct runoff at the place where it originates.

exclosure – An area fenced to exclude animals.

exclusion of livestock – Excluding all livestock from a designated area for the purpose of protecting or establishing forage or woody plants and for controlling erosion.

exotic – An organism that has been introduced from another continent.

fair market value – That value that would induce a willing seller to sell and a willing buyer to buy, usually applied to real estate in cases where the right of eminent domain is being exercised.

fallow – Allowing cropland to lie idle, either tilled or untilled, during the whole or greater portion of the growing season.

family (soil) – See soil classification.

fan – An accumulation of debris brought down by a stream on a steep gradient and debouching on a gently sloping plain in the shape of a fan, forming a section of a very low cone.

fanglomerate – Composed of heterogeneous materials which were originally deposited in an alluvial fan but which since deposition have been cemented into solid rock.

family farm – A farm business in which the operating family does most of the work, most of the managing, and takes the risks.

farm – Places of less than 10 acres where gross sales of agricultural products equal or exceed $250 annually and places of 10 acres or more where gross sales of agricultural products equal or exceed $50 per year (Bureau of Census).

farming contract – An agreement to deliver specific goods and services at a later time.

farm management – The organization and administration of farm resources, including land, labor, crops, livestock, and equipment.

farm manager – A salaried person who operates land for others and is paid a salary and/or commission for his services.

farm operator – A person who operates a farm either by performing the labor himself or directly supervising it.

farm pond – A water impoundment made by constructing a dam or embankment or by excavating a pit or "dug out". See tank, earth.

farm tenancy – The leasing or renting of farm land together with improvements and sometimes equipment by nonowners for the purpose of occupying and operating.

fault – A fracture or fracture zone along which there has been displacement of one side with respect to the other.

fauna – The animal life of a region.

feed – Harvested forage, such as hay or fodder or grain, grain products, and other foodstuffs processed for feeding livestock.

fee simple title – A title which the owner owns all rights, entire property, with unconditional power of disposition during his life.

feral – Escaped from cultivation or domestication and existing in the wild.

ferritic – See soil mineralogy classes for family groupings.

fertility, soil – The quality of a soil that enables it to provide nutrients in adequate amounts and in proper balance for the growth of specified plants when other growth factors, such as light, moisture, temperature, and the physical condition of the soil, are favorable.

fertilizer – Any organic or inorganic material of natural or synthetic origin that is added to a soil to supply elements essential to plant growth.

fertilizer analysis – The percentage composition, expressed in terms of nitrogen, phosphoric acid, and potash. For example, a fertilizer with a 6-12-6 analysis contains 6 percent nitrogen (N), 12 percent available phosphoric acid (P_2O_5), and 6 percent water-soluble potash (K_2O). Minor elements may also be included. Recent analysis expresses the percentages in terms of the elemental fertilizer (nitrogen, phosphorus, potassium).

fertilizer formula – The quantity and grade of the crude stock materials used in making a fertilizer mixture; for example, one formula for a fertilizer with an analysis of 5-10-5 could be 625 pounds of 16 percent nitrate of soda, 1,111 pounds of 18 percent superphosphate, 200 pounds of 50 percent muriate of potash, and 64 pounds of filler per ton.

fertilizer grade – The guaranteed minimum analysis, in percent, of the major plant nutrient elements contained in a fertilizer material or in a mixed fertilizer.

fertilizer unit – One percent or 20 pounds of a ton of fertilizer.

fibers (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – Fragments or pieces of plant tissue larger than 0.15 millimeter (0.006 inches) but exclusive of fragments of wood that are larger than 20 millimeters (0.8 inches) in cross section and so undecomposed that they cannot be crushed and shredded with the hands.

fibric materials – See organic soil materials.

fibrous root system – A plant root system having a large number of small, finely divided, widely spreading roots but no large individual roots. Typified by grass root system. Contrast with taproot system.

field capacity (field moisture capacity) – The amount of soil water remaining in a soil after the free water has been allowed to drain away for a day or two if the root zone has been previously saturated. It is the greatest amount of water that the soil will hold under conditions of free drainage, usually expressed as a percentage of the oven-dry weight of soil or other convenient unit.

field crops – General grain, hay, root, and fiber crops. Contrast with truck (vegetable) and fruit crops.

field planting (forestry) – The establishment of woody plants on land essentially free of trees, including woody plantings for the protection of critical slopes, stabilization of spoil banks and sand dunes, and plantings for production of wood crops and recreation.

field stripcropping – A system of stripcropping in which crops are grown in parallel strips laid out across the general slope but which do not follow the contour. Strips of grass or close-growing crops are alternated with strips of cultivated crops.

field test – An experiment conducted under field conditions. Ordinarily, less subject to control than a formal experiment and maybe less precise. Syn. Field trial.

fill (geology) – Any sediment deposited by any agent so as to fill or partly fill a channel, valley, sink, or other depression.

filter strip – Strip of permanent vegetation above farm ponds, diversion terraces, and other structures to retard flow of runoff water, causing deposition of transported material, thereby reducing sediment flow. See desilting area.

fine – See particle size classes for family groupings.

fine-loamy – See particle size classes for family groupings.

fine sand – **1:** A soil separate. See soil separates. **2:** A soil textural class. See soil texture.

fine sandy loam – See soil texture.

fine-silty – See particle size classes for family groupings.

fine texture – Consisting of or containing large quantities of the fine fractions, particularly silt and clay. Includes sandy clay, silty clay, and clay textural classes. See soil texture.

firebreak (forestry) – An existing barrier or one constructed before a fire occurs from which inflammable materials have been removed to stop or check creeping or running fires. Also serves as a line from which to work and to facilitate the movement of men and equipment in fire suppression. Roads can also be designed for firebreaks.

fire control line (forestry) – The line used either directly to stop the advance of a fire or the line from which to backfire.

fire hazard (forestry) – The risk or danger of loss or damage from burning due to the presence and type of inflammable material together with conditions favorable to burning and probable source of fire origin.

firm – A term describing the consistence of a moist soil that offers distinctly noticeable resistance to crushing but can be crushed with moderate pressure between the thumb and forefinger. See consistence.

fishing waters – Waters used for angling or for commercial fishing.

fishpond – A small body of water managed for fish.

fish screen – A porous barrier placed across the inlet or outlet of a pond to prevent the passage of fish.

fishway – A passageway designed to enable fish to ascend a dam, cataract, or velocity barrier. Syn. fish ladder.

fissile – A property of splitting easily along closely spaced, parallel planes.

fixation – The process or processes in a soil by which certain chemical elements essential for plant growth are converted from a soluble or exchangeable form to a much less soluble or to a nonexchangeable form, for example, phosphate fixation. Contrast with nitrogen fixation.

fixed costs – Costs which are largely determined in advance of the year's operation and subject to little or no control on the part of the farmer, for example, rent of land, payment of taxes, interest on borrowed money, and upkeep of buildings, fences, and drains.

fixed phosphorus – Soluble phosphorus that has become attached to the solid phase of the soil in forms highly unavailable to crops; unavailable phosphorus; phosphorus in other than readily or moderately available forms.

flaggy – An adjective incorporated into the soil textural class designations of horizons when the soil mass contains between 15 and 90 percent by volume of flagstones. See flagstone as defined under coarse fragments.

flagstone – See coarse fragments.

flashboard – Plank generally held horizontally in vertical slots on the crest of a dam or check structure to control the upstream water level.

flocculate – To aggregate or clump together individual, tiny soil particles, especially fine clay, into small clumps or granules. Opposite of deflocculate or disperse.

flocculation – The process by which suspended colloidal or very fine particles are assembled into larger masses or floccules which eventually settle out of suspension.

flood – An overflow or inundation that comes from a river or other body of water and causes or threatens damage.

flood control – Methods or facilities for reducing flood flows.

flood control project – A structural system installed for protection of land and improvements from floods by the construction of dikes, river embankments, channels, or dams.

floodgate – A gate placed in a channel or closed conduit to keep out floodwater or tidal backwater.

flood irrigation – The application of irrigation water where the entire surface of the soil is covered by a sheet of water, called "controlled flooding" when water is impounded or the flow directed by border dikes, ridges, or ditches.

flood peak – The highest value of the stage or discharge attained by a flood, thus, peak stage or peak discharge.

floodplain – Nearly level land situated on either side of a channel which is subject to overflow flooding.

flood stage – The stage at which overflow of the natural banks of a stream begins to cause damage in the reach in which the elevation is measured.

floodwater retarding structure – A structure providing for temporary storage of floodwater and for its controlled release.

floodway – A channel, either natural, excavated, or bounded by dikes and levees, used to carry excessive flood flows to reduce flooding. Sometimes considered to be the transitional area between the active channel and the floodplain.

flora – The sum total of the kinds of plants in an area at one time.

flume – An open conduit on a prepared grade, trestle, or bridge for the purpose of carrying water across creeks, gullies, ravines, or other obstructions. It may also apply to an entire canal where it is elevated above natural ground for its entire length. Sometimes used in reference to calibrated devices used to measure the flow of water in open conduits. See Venturi flume.

fluvial – Of or pertaining to rivers; growing or living in streams or ponds; produced by river action, as a fluvial plain.

fluvioglacial – Pertaining to streams flowing from glaciers or to the deposits made by such streams.

flyway – A migrating route of birds.

fodder – The dried, cured plants of tall, coarse grain crops, such as corn and sorghum, including the grain, stems, and leaves. Grain parts not snapped off or threshed. Contrast with stover and hay.

fold (geology) – A bend or flexure in a layer or layers of rock.

food chain – A series of plant or animal species in a community, each of which is related to the next as a source of food.

forage – All browse and herbaceous food that is available to livestock or game animals, used for grazing or harvested for feeding.

forage fish – Small, prolific species of fish that serve as prey for predatory fish.

forb – A herbaceous plant which is not a grass, sedge, or rush.

forest – A plant association predominantly of trees and other woody vegetation.

forest influences – The effects of forests on soil, water supply, climate, and environment.

forest range – See grazable woodland.

formation (geology) – Any assembly of rocks, that have some characteristic in common, whether of origin, age, or composition.

FORTRAN – Formula translations; any of several specific procedure-oriented programming languages for digital computers.

fracture – A manner of breaking or appearance of a mineral when broken that is distinctive for certain minerals, as conchoidal fracture.

fragipan – A natural subsurface horizon with high bulk density relative to the solum above, seemingly cemented when dry but showing a moderate to weak brittleness when moist. The layer is low in organic matter, mottled, slowly or very slowly permeable to water, and usually shows occasional or frequent bleached cracks forming polygons. It may be found in profiles of either cultivated or virgin soils but not in calcareous material.

fragmental – See particle size classes for family groupings.

freeboard (hydraulics) – Vertical distance between the maximum water surface elevation anticipated in design and the top of retaining banks or structures provided to prevent overtopping because of unforeseen conditions.

free flow (hydraulics) – Flow through or over a structure not affected by submergence or backwater.

free-flowing weir – A weir which in use has the tailwater lower than the crest of the weir. Contrast with submerged weir.

frequency – A statistical expression of the presence or absence of individuals of a species in a series of subsamples, that is, the ratio between the number of sample areas that contains a species and the total number of sample areas.

frequency curve – A graphical representation of the frequency of occurrence of specific events, such as flood peaks, precipitation amounts, annual or seasonal runoff, etc.

friable – Easy to break, crumble, or crush.

friction head – Energy required to overcome friction due to fluid movement with respect to the walls of the conduit or containing medium.

friction slope (hydraulics) – The energy loss per unit of length of conduit due to friction.

frigid – See soil temperature classes for family groupings.

fringe water – Water occurring in the capillary fringe.

frost heave – The raising of a surface due to the accumulation of ice in the underlying soil.

full owner-operators – Those who operate land which they own and do not rent land to or from others.

full owner-operator-landlords – Those who operate some of the land they own but also rent out some land.

functional plan – A plan for one element or closely related elements of a comprehensive plan, for example, transportation, recreation, and open spaces. Such plans, of necessity, should be closely related to the land use plan. Plans that fall short of considering all elements of a comprehensive plan may be considered as functional plans. Thus, resource conservation and development plans and watershed project plans should be considered as functional plans.

furbearer – A mammal sought for its fur.

furrow dams – Small earth dams used to impound water in furrows. See lister.

furrow irrigation – A partial surface flooding method of irrigation normally used with clean-tilled crops where water is applied in furrows or rows of sufficient capacity to contain the designed irrigation stream.

gage or **gauge** – Device for registering precipitation, water level, discharge, velocity, pressure, temperature, etc.

gage height (hydraulics) – The height of the water surface above some arbitrary datum, such as the bottom of the channel. See stage.

gaging station – A selected section of a stream channel equipped with a gage, recorder, or other facilities for determining stream discharge.

game animal – An animal sought for its fur, flesh, or trophy value, or one so defined by law.

game management – The art of producing sustained annual crops of wild game animals.

game refuge – An area designated for the protection of game animals within which hunting and fishing is either prohibited or strictly controlled.

gate (irrigation) – Structure or device for controlling the rate of flow into or from a canal, ditch, or pipe.

gated pipe – Portable pipe with small gates installed along one side for distributing water to corrugations or furrows.

gel – A jellylike material formed by the coagulation of a colloidal suspension or sol.

genotype – The genetic constitution of an individual or group.

geochemistry – All parts of geology that involve chemical changes. It is the study of (1) the relative and absolute abundances of the elements and the atomic species (isotypes) in the earth and (2) the distribution and migration of the individual elements in the various parts of the earth (the atmosphere, hydrosphere, lithosphere, etc.) and in minerals and rocks, with the object of discovering principles governing this distribution and migration.

geode – A hollow nodule that may be lined with inwardly pointing crystals.

geological erosion – See erosion.

geomorphology – That branch of both physiography and geology that deals with the form of the earth, the general configuration of its surface, and the changes that take place in the evolution of land forms.

girdling – The encircling of the trunk of a tree with a continuous series of cuts deep enough to kill the tree.

glacial drift – See drift, glacial.

glacial till – See till.

glaciofluvial deposits – Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and may occur in the form of outwash plains, deltas, kames, eskers, and kame terraces. See glacial drift; till.

goods (economics) – All physical objects and those personal and other services used by people.

governing body, conservation district – The appointed or elected supervisors (directors or commissioners) of a (soil or soil and water) conservation district established according to state law. Name of district, number and method of naming members of governing body, and tenure varies with state laws; usual number is five.

gradation (geology) – The bringing of a surface or a stream bed to grade, by running water. As used in connection with sedimentation and fragmental products for engineering evaluation, the term gradation refers to the frequency distribution of the various sized grains that constitute a sediment, soil, or other material.

grade – **1**: The slope of a road, channel, or natural ground. **2**: The finished surface of a canal bed, roadbed, top of embankment, or bottom of excavation; any surface prepared for the support of construction like paving or laying a conduit. **3**: To finish the surface of a canal bed, roadbed, top of embankment, or bottom of excavation.

graded stream – A stream in which, over a period of years, the slope is delicately adjusted to provide, with available discharge and with prevailing channel characteristics, just the velocity required for transportation of the load (of sediment) supplied from the drainage basin. The graded profile is a slope of transportation. It is a phenomenon in which the element of time has a restricted connotation. Works of man are limited to his experience and of design and construction.

graded terrace – See terrace.

grade stabilization structure – A structure for the purpose of stabilizing the grade of a gully or other watercourse, thereby preventing further head-cutting or lowering of the channel grade.

gradient – Change of elevation, velocity, pressure, or other characteristics per unit length; slope.

granular structure – See soil structure.

grass – A member of the botanical family Gramineae, characterized by bladelike leaves arranged on the culm or stem in two ranks.

grassed waterway – A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from cropland.

grassland – Land on which the existing plant cover is dominated by grasses. See natural grassland.

grasslike plants – A plant that resembles a true grass, for example, sedges and rushes, but is taxonomically different.

gravel – A mass of pebbles. See coarse fragments.

gravel envelope – Selected aggregate placed around the screened pipe section of well casing or a subsurface drain to facilitate the entry of water into the well or drain.

gravel filter – Graded sand and gravel aggregate placed around a drain or well screen to prevent the movement of fine materials from the aquifer into the drain or well.

gravelly – An adjective incorporated into the soil textural class designations of horizons when the soil mass contains between 15 and 90 percent pebbles by volume. See pebble as defined under coarse fragments.

gravitational water – Water that moves into, through, or out of the soil under the influence of gravity.

gravity dam – Dam that depends on its weight to resist overturning.

gravity irrigation – Irrigation in which the water is not pumped but flows and is distributed by gravity, includes sprinkler systems when gravity furnishes the desired head.

Gray-Brown Podzolic soil – A zonal great soil group consisting of soils with a thin, moderately dark A1 horizon and a grayish brown A2 horizon underlain by a B horizon containing a high percentage of cations and an appreciable quantity of illuviated silicate clay, formed on relatively young land surfaces, mostly glacial deposits, from material relatively rich in calcium under deciduous forests in humid temperate regions.

Gray Wooded soils – A zonal great soil group consisting of soils with a thin A1 horizon over a light-colored, bleached (A2) horizon underlain by a B horizon containing a high percentage of bases and an appreciable quantity of illuviated silicate clay. These soils occur in subhumid to semiarid, cool climatic regions under coniferous, deciduous, or mixed forest cover.

grazable woodland – Forest land on which the understory includes, as an integral part of the forest plant community, plants that can be grazed without significantly impairing other forest values.

grazing – The eating of any kind of standing vegetation by domestic livestock or wild animals.

grazing capacity – The maximum stocking rate possible without inducing damage to vegetation or related resources.

grazing distribution – Dispersion of livestock grazing within a management unit or area.

grazing land – Land used regularly for grazing. The term is not confined to land suitable only for grazing. Cropland and pasture used in connection with a system of farm crop rotation are usually not included.

grazing period – See grazing season.

grazing permit – A document authorizing the use of public or other lands for grazing purposes under specified conditions, issued to the livestock operator by the agency administering the lands.

grazing preference – In the administration of public grazing lands, the basis upon which permits and licenses are issued for grazing use.

grazing season – The portion of the year that livestock grazes or is permitted to graze on a given range or pasture. Sometimes called grazing period.

grazing system – The manipulation of grazing animals to accomplish a desired result.

grazing unit – Any division of the range or pasture used to facilitate administration or the handling of livestock.

great group – See soil classification.

green chop – The cutting and hauling of green herbage to animals usually confined to a dry lot. Also called zero grazing.

green manure crop – Any crop grown for the purpose of being turned under while green or soon after maturity for soil improvement.

gross duty of water (irrigation) – The irrigation water diverted at the intake of a canal system, usually expressed in depth on the irrigable area under the system; diversion requirement. Contrast with net duty of water.

gross farm income – The total gross income realized by farm operators from farming, including cash receipts from the sale of farm products, government payments, value of food and fuel produced and consumed on farms where grown, and rental value of farm dwellings.

Gross National Product – The monetary value of the total output of goods and services within a country in a given period of time, usually a year. Its value does not include allowances for depreciation or the consumption of capital goods. Abbr. GNP.

groundwater – Phreatic water or subsurface water in the zone of saturation.

Ground-Water Podzol soil – A great soil group of the intrazonal order and hydromorphic suborder, consisting of soils with an organic mat on the surface over a very thin layer of acid humus material underlain by a whitish gray leached layer which may be as much as 2 or 3 feet in thickness and is underlain by a brown or very dark brown cemented hardpan layer, formed under various types of forest vegetation in cool to tropical, humid climates under conditions of poor drainage.

grove – A group of trees without understory; a wood of small extent, for example, sugar grove.

growing stock (forestry) – The sum, by number or volume, of all the trees in a forest or a specified part of it.

Grumusol – A great soil group of the intrazonal order of dark clay soils, developed under widely varying climatic conditions but usually with alternating wet and dry seasons, composed of clays with a high shrink-swell potential.

guest ranch – A rural area operated as a working or simulated ranch that provides vacation living accommodations for a fee.

gully – A channel or miniature valley cut by concentrated runoff but through which water commonly flows only during and immediately after heavy rains or during the melting of snow. A gully may be dendritic or branching or it may be linear, rather long, narrow, and of uniform width. The distinction between gully and rill is one of depth. A gully is sufficiently deep that it would not be obliterated by normal tillage operations, whereas a rill is of lesser depth and would be smoothed by ordinary farm tillage. Syn. arroyo. See erosion; rill.

gully erosion – See erosion.

gully control plantings – The planting of forage, legume, or woody plant seeds, seedlings, cuttings, or transplants in gullies to establish or re-establish a vegetative cover adequate to control runoff and erosion and incidentally produce useful products.

habitat – The environment in which the life needs of a plant or animal are supplied.

Half-Bog soils – A great soil group of the intrazonal order and hydromorphic suborder, consisting of soil with dark brown or black peaty material over grayish and rust-mottled mineral soil, formed under conditions of poor drainage under forest, sedge, or grass vegetation in cool to tropical humid climates.

half-shrub – A perennial plant with a woody base whose annually produced stems die back each year.

halophyte – A plant adapted to existence in a saline environment, such as greasewood (*Sorcobatas*), saltgrass (*Distichlis*), and the saltbushes (*Atriplex* spp.).

hardpan – A hardened soil layer in the lower A or in the B horizon caused by cementation of soil particles with organic matter or with materials such as silica, sesquioxides, or calcium carbonate. The hardness does not change appreciably with changes in moisture content, and pieces of the hard layer do not slake in water. See caliche; duripan; ortstein.

hard seed – A physiological condition of seed in which some seeds do not absorb water or oxygen and germinate when a favorable environment is provided.

harvest cutting (forestry) – The removal of a crop or stand of financially or physically mature trees as a final cut in even-aged management or the removal of mature trees in uneven-aged management. One of the major objectives is to encourage regeneration.

hay – The dried stems and leafy parts of plants cut and harvested by man, such as alfalfa, clovers, other forage legumes, and the finer stemmed, leafy grasses. Contrast with fodder; stover.

hayland – Land used primarily for the production of hay from long-term stands of adapted forage plants.

head (hydraulics) – 1: The height of water above any plane or reference. 2: The energy, either kinetic or potential, possessed by each unit weight of a liquid, expressed as the vertical height through which a unit weight would have to fall to release the average energy possessed. Used in various compound terms such as pressure head, velocity head, and lost head.

head gate – Water control structure; the gate at the entrance to a conduit.

head loss – Energy loss due to friction, eddies, changes in velocity, or direction of flow. See friction head.

headwater – 1: The source of a stream. 2: The water upstream from a structure or point on a stream.

headworks – The diversion structures at the head of a conduit.

heaving – The partial lifting of plants out of the ground, frequently breaking their roots, as a result of freezing and thawing of the surface soil during the winter.

heavy soil – A commonly used term to describe various fine-textured soils.

hedged – A term used to describe the appearance of browse plants that have been browsed so as to appear artificially clipped.

hedgerow – A barrier of bushes, shrubs, or small trees growing close together in a line.

heel-in – To store young trees and other plants in a temporary trench, covering the roots with soil, to keep them from drying out before they are permanently planted.

hemic materials – See organic soil materials.

herb – Any flowering plant except those developing persistent woody bases and stems above ground.

herbage – The sum total of all herbaceous plants.

herbicide – A chemical substance used for killing plants, especially weeds.

herd – A group of animals, especially cattle or big game, collectively considered as a unit in grazing practices.

heterogeneous – Differing in kind; having unlike qualities; possessed of different characteristics; opposed to homogeneous.

highway erosion control – The prevention and control of erosion in ditches, at cross drains, and on fills and road banks within a highway right-of-way. Includes vegetative practices and structural practices.

histic epipedon – See diagnostic horizons.

Histosols – See soil classification.

hogback – A sharp-crested ridge formed by a hard rock ledge.

homogeneous – Of the same kind or nature; consisting of similar parts or of elements of a like nature; opposed to heterogeneous.

hood inlet – Entrance to a closed conduit that has been shaped to induce full flow at minimum water surface elevation.

horizon – See soil horizon.

hue – One of the three variables of color, caused by light of certain wavelengths and changes with the wavelength. See Munsell color system; chroma; value.

hulled seed – Any seed normally covered by a hull, that is, by bracts or other coating, from which the hull has been removed.

Humic Gley soils – Any intrazonal great soil group of poorly drained, hydromorphic soils with dark-colored, organic mineral horizons of moderate thickness, underlain by gray mineral horizons developed under wet conditions.

humid – A term applied to regions or climates where moisture, when distributed normally throughout the year, should not be a limiting factor in the production of most crops. The lower limit of precipitation under cool climates may be as little as 20 inches annually. In hot climates it may be as much as 60 inches. Natural vegetation is generally forest. Contrast with subhumid.

humidity, absolute – The actual quantity or mass of water vapor present in a given volume of air, generally expressed in grains per cubic foot or in grams per cubic meter.

humidity, relative – The ratio of the actual amount of water vapor present in the portion of the atmosphere under consideration to the quantity that would be there if it were saturated.

humus – 1: That more or less stable fraction of the soil organic matter remaining after the major portion of added plant and animal residues have decomposed, usually amorphous and dark colored. 2: Includes the F and H layers in undistrubed forest soils. See soil organic matter; soil horizons 01 and 02.

humus layer – The top portion of the soil which owes its characteristic features to the humus contained in it.

hunting area – A tract of land or land and water managed for the production and harvest of wildlife.

hydration – The chemical combination of water with another substance.

hydraulic conductivity – See permeability.

hydraulic fill dam – A dam composed of earth material pumped into place with water; generally the fines are washed toward the center for greater imperviousness.

hydraulic grade line – In a closed conduit, a line joining the elevations to which water could stand in risers or vertical pipes connected to the conduit at their lower end and open at their upper end. In open channel flow, the hydraulic grade line is the free-water surface.

hydraulic gradient – The slope of the hydraulic grade line. The slope of the free surface of water flowing in an open channel.

hydraulic jump – Sudden turbulent rise in water level from a flow stage below critical depth to flow stage above critical depth, during which the velocity passes from supercritical to subcritical.

hydraulic radius – The cross-sectional area of a stream divided by its wetted perimeter. The "r" in Manning's Formula.

hydrograph – A graph showing variation in stage (depth) or discharge of a stream of water over a period of time.

hydrologic cycle – The circuit of water movement from the atmosphere to the earth and return to the atmosphere through various stages or processes, as precipitation, interception, runoff, infiltration, percolation, storage, evaporation, and transpiration.

hydrophyte – A plant that grows in water or in wet or saturated soils, as distinguished from the opposite, xerophyte, and the intermediate, mesophyte.

hydrostatic pressure – Force per unit area exerted by a liquid at rest.

hydrous mica – A hydrous aluminum silicate clay mineral with 2:1 lattice structure and containing a considerable amount of potassium which serves as an additional bonding between the crystal units, resulting in particles larger than normal in montmorillonite. It has a smaller cation-exchange capacity than montmorillonite. Sometimes referred to as illite or mica. See clay mineral; montmorillonite.

hydroxide – A compound of an element with the radicle or ion OH negative, as sodium hydroxide, NaOH.

hygroscopic coefficient – The weight percentage of water held by, or remaining in, the soil (1) after the soil has been air-dried or (2) after the soil has reached equilibrium with an unspecified environment of high relative humidity, usually near saturation, or with a specified relative humidity at a specified temperature.

hygroscopic water – Water so tightly held by the attraction of soil particles that it cannot be removed except as a vapor by raising the temperature above the boiling point of water. It is unavailable to plants.

hyperthermic – See soil temperature for family groupings.

igneous rock – Formed by solidification from a molten or partially molten state. Primary rock.

illite – See hydrous mica.

illitic – See soil mineralogy classes for family groupings.

illuvial horizon – A soil layer or horizon in which material carried from an overlying layer has been precipitated from solution or deposited from suspension. The layer of accumulation. See eluvial horizon.

illuviation – The process of deposition of soil material removed from one horizon to another in the soil, usually from an upper to a lower horizon in the soil profile. See eluviation.

impervious soil – A soil through which water, air, or roots cannot penetrate. No soil is impervious to water and air all the time.

impoundment – Generally, an artificial collection or storage of water, as a reservoir, pit, dugout, sump, etc. See reservoir.

improvement cutting, intermediate (forestry) – A cutting made in an immature stand to harvest a useable product and to improve the stand's composition and character by removing undesirable species and trees of poor form and condition. See thinning; harvest cutting.

Inceptisols – See soil classification.

income-producing recreation – Providing recreation opportunities planned and developed as a suitable use of land and water resources primarily to produce income.

increaser plant species – Plant species of the original vegetation that increase in relative amount, at least for a time, under overuse. Commonly termed increasers.

increment (forestry) – The increase in diameter, basal area, height, volume, quality, or value of a tree or stand during a given period.

index number – Expression of the relationship of a given situation with that of a base-period value of 100; used to express the rate or degree of change, especially in prices or production.

indicator – An organism, species, or community that shows the presence of certain environmental conditions.

indigenous – Refers to an organism that is native, not introduced, in an area.

indurate – Applied to rocks hardened by heat, pressure, or cementation.

indurated (soil) – Soil material cemented into a hard mass that will not soften on wetting. See hardpan; consistence.

industrial park – A tract of land, the control and administration of which are vested in a single body, suitable for industrial use because of location, topography, proper zoning, availability of utilities, and accessibility to transportation.

infiltration – The flow of a liquid into a substance through pores or other openings, connoting flow into a soil in contradistinction to the word percolation which connotes flow through a porous substance.

infiltration index – Rate of infiltration calculated from records of rainfall and runoff. There are several different indices, each average rainfall intensity for a given storm, above which the mass of rainfall equals the mass of runoff.

infiltration rate – A soil characteristic determining or describing the maximum rate at which water can enter the soil under specified conditions, including the presence of an excess of water. See infiltration velocity.

infiltration velocity – The actual rate at which water is entering the soil at any given time. It may be less than the maximum (the infiltration rate) because of a limited supply of water (rainfall or irrigation). It has the same units as the infiltration rate. See infiltration rate.

infiltrometer – A device for measuring the rate of entry of fluid into a porous body, for example, water into soil.

influent water – That which flows into sink holes, open cavities, and porous materials and disappears into the ground.

inlet (hydraulics) – 1: A surface connection to a closed drain. 2: A structure at the diversion end of a conduit. 3: The upstream end of any structure through which water may flow.

inoculation – The process of introducing pure or mixed cultures or microorganisms into natural or artificial culture media.

intake – 1: The headworks of a conduit; the place of diversion, 2: Entry of water into soil. See infiltration.

intake rate – The rate of entry of water into soil. See infiltration rate.

in situ – In place. Rocks, soil, and fossils that are situated in the place where they were originally formed or deposited.

institutional factors – These involve the collective actions of people in the control, liberation, or expansion of individual actions, for example, government organizations, laws, education, and customs.

intensity – See rainfall intensity.

intensive cropping – Maximum use of the land by means of frequent succession of harvested crops.

interception (hydraulics) – The process by which precipitation is caught and held by foliage, twigs, and branches of trees, shrubs, and other vegetation. Often used for "interception loss" or the amount of water evaporated from the precipitation intercepted.

interception channel – A channel excavated at the top of earth cuts, at the foot of slopes or at other critical places to intercept surface flow; a catch drain. Syn. interception ditch.

interceptor drain – Surface or subsurface drain, or a combination of both, designed and installed to intercept flowing water.

interflow – That portion of rainfall that infiltrates into the soil and moves laterally through the upper soil horizons until intercepted by a stream channel or until it returns to the surface at some point downslope from its point of infiltration.

intermittent grazing – Alternate grazing and resting a pasture or range for variable periods of time. See rotation grazing.

intermittent stream – A stream or portion of a stream that flows only in direct response to precipitation. It receives little or no water from springs and no long-continued supply from melting snow or other sources. It is dry for a large part of the year, ordinarily more than 3 months.

internal soil drainage – The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure, and other characteristics of the soil profile and underlying layers and by the height of the water table, either permanent or perched. Relative terms for expressing internal drainage are none, very slow, slow, medium, rapid, and very rapid.

interplanting – In woodland, planting of young trees among existing trees or brushy growth. In orchards, planting of farm crops among the trees, especially while the trees are too small to occupy the land completely. In cropland, planting of several crops together on the same land, for example, the planting of beans with corn.

interseeding – Seeding into an established vegetation.

interspersion (wildlife) – The distribution of heterogeneous cover types and plant species in a limited area.

interstices – The pore space or voids in soil and rock.

introduced species – See exotic.

intrusive – Denoting igneous rocks in a molten state which have invaded other rock formations and cooled below the surface of the earth.

invader plant species – Plant species that were absent in undisturbed portions of the original vegetation and will invade under disturbance or continued overuse. Commonly termed invaders.

invasion – The migration of organisms from one area to another area and their establishment in the latter.

invert – Lowest part of the internal cross-section of a lined channel or conduit.

inverted siphon – Pipeline with end sections above the middle section, used for crossing under a highway or depression. The term is common but inappropriate as no siphon action is involved.

ion – An atom or group of atoms with an electrical charge.

irrigable lands – Lands having soil, topographic, drainage, and climatic conditions favorable for irrigation and located in a position where a water supply is or can be made available.

irrigation – Application of water to lands for agricultural purposes.

irrigation application efficiency – Percentage of irrigation water applied to an area that is stored in the soil for crop use.

irrigation district – A cooperative, self-governing public corporation set up as a subdivision of the state, with definite geographic boundaries, organized to obtain and distribute water for irrigation of lands within the district. It is created under authority of the state legislature with the consent of a designated fraction of the landowners or citizens and has taxing power.

irrigation frequency – Time interval between irrigations.

irrigation lateral – A branch of the main canal conveying water to the farm ditches, sometimes used in reference to farm ditches.

irrigation structure – Any structure or device necessary for the proper conveyance, control, measurement, or application of irrigation water.

irrigation water management – The use and management of irrigation water where the quantity of water used for each irrigation is determined by the water-holding capacity of the soil and the need for the crop, and where the water is applied at a rate and in such a manner that the crop can use it efficiently and significant erosion does not occur.

irrigation water requirement – Quantity of water, exclusive of effective precipitation, that is required for crop production.

isofrigid – See soil temperature classes for family groupings.

isohyperthermic – See soil temperature classes for family groupings.

isomesic – See soil temperature classes for family groupings.

isothermic – See soil temperature classes for family groupings.

jetty – A structure built of piles, rocks, or other material extending into a stream or into the sea to induce scouring or bank building, or for protection.

joint – A fracture or parting that abruptly interupts the physical continuity of a rock mass.

kame – A conical hill or short irregular ridge of gravel or sand deposited in contact with glacier ice.

kaolin – A rock consisting of clay minerals of the kaolinite group.

kaolinite – 1: Hydrous aluminum silicate clay mineral of the 1:1 crystal lattice group, that is, consisting of one silicon tetrahedral layer and one aluminum oxide-hydroxide octahedral layer. 2: The 1:1 group or family of aluminosilicates.

kaolinitic – See soil mineralogy classes for family groupings.

key grazing area – That portion of a pasture or grazing unit which, because of its nature, location, and grazing use, serves to control the pattern of grazing use for the pasture as a whole.

key management species – Major forage species on which management should be based.

key terrace – Staked terrace line that is selected as a reference in laying out other terraces.

key utilization species – Species whose use indicates the degree of use of selected grazing areas.

lagoon (geology) – A shallow sound, channel, pond, or lake connected with the sea.

lagoon, sewage – Ponding effluent for septic action.

lagtime (hydrology) – See watershed lag. (flood irrigation) – The period between the time that the irrigation stream is turned off at the upper end of an irrigated area and the time that water disappears from the surface at the point or points of application.

laminar flow (hydraulics) – Flow in which there are no cross currents or eddies and where the fluid particles move in approximately parallel directions.

lamination – A layering or bedding less than 1 centimeter thick in sedimentary rocks.

land – The total natural and cultural environment within which production takes place; a broader term than soil. In addition to soil, its attributes include other physical conditions, such as mineral deposits, climate, and water supply; location in relation to centers of commerce, populations, and other land; the size of the individual tracts or holdings; and existing plant cover, works of improvement, and the like. Some use the term loosely in other senses: as defined above but without the economic or cultural criteria; especially in the expression "natural land"; as a synonym for "soil"; for the solid surface of the earth; and also for earthy surface formations, especially in the geomorphological expression "land form".

land capability – The suitability of land for use without permanent damage. Land capability, as ordinarily used in the United States, is an expression of the effect of physical land conditions, including climate, on the total suitability for use without damage for crops that require regular tillage, for grazing, for woodland, and for wildlife. Land capability involves consideration of (1) the risks of land damage from erosion and other causes and (2) the difficulties in land use owing to physical land characteristics, including climate.

land capability class – One of the eight classes of land in the land capability classification of the Soil Conservation Service. These eight land capability classes, distinguished according to the risk of land damage or the difficulty of land use, are:

Land suitable for cultivation and other uses.

I. Soils in class I have few limitations that restrict their use.

II. Soils in class II have some limitations that reduce the choice of plants or require moderate conservation practices.

III. Soils in class III have severe limitations that reduce the choice of plants or require special conservation practices, or both.

IV. Soils in class IV have very severe limitations that restrict the choice of plants, require very careful management, or both.

Land generally not suitable for cultivation (without major treatment).

V. Soils in class V have little or no erosion hazard but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.

VI. Soils in class VI have severe limitations that make them generally unsuited for cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.

VII. Soils in class VII have very severe limitations that make them unsuited to cultivation and that restricts their use largely to grazing, woodland, or wildlife.

VIII. Soils and landforms in class VIII have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, water supply, or esthetic purposes.

land capability classification – A grouping of kinds of soil into special units, subclasses, and classes according to their capability for intensive use and the treatments required for sustained use, prepared by the Soil Conservation Service, USDA.

land capability map – A map showing land capability units, subclasses, and classes or a soil survey map colored to show land capability classes.

land capability subclass – Groups of capability units within classes of the land capability classification that have the same kinds of dominant limitations for agricultural use as a result of soil and climate. Some soils are subject to erosion if they are not protected, while others are naturally wet and must be drained if crops are to be grown. Some soils are shallow or droughty or have other soil deficiencies. Still other soils occur in areas where climate limits their use. The four kinds of limitations recognized at the subclass level are: risks of erosion, designated by the symbol (e); wetness, drainage, or overflow (w); other root zone limitations (s); and climatic limitations (c). The subclass provides the map user information about both the degree and kind of limitation. Capability class I has no subclasses.

land capability unit – Capability units provide more specific and detailed information for application to specific fields on a farm or ranch than the subclass of the land capability classification. A capability unit is a group of soils that are nearly alike in suitability for plant growth and responses to the same kinds of soil management.

land classification – The arrangement of land units into various categories based on the properties of the land or its suitability for some particular purpose.

land form – A discernible natural landscape, such as a floodplain, stream terrace, plateau, valley, etc.

land leveling – Process of shaping the land surface for better movement of water and machinery over the land. Also called land forming, land shaping, or land grading.

land marginal – Land that returns barely enough to meet expenses in a specific use.

land reclamation – Making land capable of more intensive use by changing its general character, as by drainage of excessively wet land; irrigation of arid or semiarid land; or recovery of submerged land from seas, lakes, and rivers. Large-scale reclamation projects usually are carried out through collective effort. Simple improvements, such as cleaning of stumps or stones from land, should not be referred to as land reclamation.

land resource area – An area of land reasonably alike in its relationship to agriculture with emphasis on combinations and/or intensities of problems in soil and water conservation, ordinarily larger than a land resource unit and smaller than a land resource region.

land resource region – A generalized grouping of land resource areas reflecting regional relationships to agriculture with emphasis on soil and water conservation.

land resource unit – A subdivision of a land resource area with emphasis on a specialized type of agriculture, intensities, or problems in soil and water conservation. It has a narrower range in relationship to agriculture with emphasis on soil and water conservation.

land resting – Temporary discontinuance of cultivation of a piece of land.

landscape – All the natural features, such as fields, hills, forests, water, etc., that distinguish one part of the earth's surface from another part, usually that portion of land or territory which the eye can comprehend in a single view, including all of its natural characteristics.

landslide – The failure of a slope in which the movement of the soil mass takes place along an interior surface of sliding.

land, submarginal – Land that does not return enough to pay costs of operation in a specific use.

land, supermarginal – Land that returns a profit after all expenses are paid.

land tenure – The holding of land and the rights that go with such holding, including all forms of holding from fee simple title embracing all possible rights within the general limitations imposed by the government, to the various forms of tenancy or holding of land owned by another.

land use plan – A community plan outlining proposed future land uses and their distribution. Zoning is the most frequently used method for carrying out the land use plan.

land use planning – The process by which decisions are made on future land uses over extended time periods that are deemed to best serve the general welfare. Decision-making authorities on land uses are usually vested in state and local governmental units, but citizen participation in the planning process is essential for proper understanding and implementation, usually through zoning ordinances.

lateral – Secondary or side channel, ditch, or conduit. Sometimes called branch line or drain, spur, lateral ditch, group lateral.

Laterite soils – Similar to Latosols.

Latosols – A great soil group of zonal soils including soils formed under forested, tropical, humid conditions and characterized by low silica-sesquioxide ratios of the clay fractions, low base-exchange capacity, low activity of the clay, low content of most primary minerals, low content of soluble constituents, and a high degree of aggregate stability; usually having a red color.

Law of Demand – The quantity of a commodity that potential buyers are willing to take varies inversely with the price. The greater the amount of a given quantity offered for sale on a given market at a given time, the lower the price per unit of measure at which the entire amount can be sold.

Law of Dimishing Returns – When other factors in production do not change, successive increases in the input of one factor will not yield proportionate increases in product; for example, fertilizer can be used so heavily that additional applications will give little or no increase in yield.

Law of Supply – The quantity of a commodity that will be produced or offered for sale varies directly with the price. The greater the amount of a given product offered for sale on a given market at a given time, the lower the price per unit at which the entire amount can be sold.

leached layer – A soil layer from which the soluble materials ($CaCO_3$ and $MgCO_3$ and material more soluble) have been dissolved and washed away by percolating water.

leached saline soils – 1: Soils from which the soluble salts have been removed by leaching. 2: Soils that have been saline and still possess the major physical characteristics of saline soils but from which the soluble salts have been leached, generally for reclamation.

leached soil – A soil from which most of the soluble materials ($CaCO_3$ and $MgCO_3$ and more soluble materials) have been removed from the entire profile or have been removed from one part of the profile and have accumulated in another part.

leaching – The removal of materials in solution from the soil. See eluviation.

legume – A member of the legume or pulse family, *Leguminosae.* One of the most important and widely distributed plant families. The fruit is a "legume" or pod that opens along two sutures when ripe. Flowers are usually papilionaceous (butterflylike). Leaves are alternate, have stipules, and are usually compound. Includes many valuable food and forage species, such as the peas, beans, peanuts, clovers, alfalfas, sweet clovers, lespedezas, vetches, and kudzu. Practically all legumes are nitrogen-fixing plants.

legume inoculation – The addition of nitrogen-fixing bacteria to legume seed or to the soil in which the seed is to be planted.

length of run – Distance water must run in furrows or between borders over the surface of a field from one head ditch to another, or to the end of the field.

levee – See dike.

level terrace – See terrace.

light soil – A coarse-textured soil with a low drawbar pull and, hence, easy to cultivate. See coarse texture; soil texture.

lime – Lime, from the strictly chemical standpoint, refers to only one compound, calcium oxide (CaO); however, the term lime is commonly used in agriculture to include a great variety of materials which are usually composed of the oxide, hydroxide, or carbonate of calcium or of calcium and magnesium. The most commonly used forms of agricultural lime are ground limestone (carbonates), hydrated lime (hydroxides), burnt lime (oxides), marl, and oyster shells.

lime, agricultural – A soil amendment consisting principally of calcium carbonate but including magnesium carbonate and perhaps other materials, used to furnish calcium and magnesium as essential elements for the growth of plants and to neutralize soil acidity.

lime (calcium) requirement – The amount of agricultural limestone, or the equivalent of other specified liming material, required per acre to a soil depth of 6 inches (or on 2 million pounds of soil) to raise the pH of the soil to a desired value under field conditions.

lime concretion – An aggregate of precipitated calcium carbonate or other material cemented by precipitated calcium carbonate.

limestone – A sedimentary rock composed of calcium carbonate, $CaCO_3$. There are many impure varieties.

liming – The application of lime to land, primarily to reduce soil acidity and supply calcium for plant growth. Dolomitic limestone supplies both calcium and magnesium. May also improve soil structure, organic matter content, and nitrogen content of the soil by encouraging the growth of legumes and soil microorganisms. Liming an acid soil to a pH value of about 6.5 is desirable for maintaining a high degree of availability of most of the nutrient elements required by plants.

limnic materials (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – Includes both organic and inorganic materials either (1) deposited in water by precipitation or action of aquatic organisms, such as algae or diatoms, or (2) derived from underwater and floating aquatic plants subsequently modified by aquatic animals. Examples are marl, diatomaceous earth, and coprogenous earth (sedimentary peat).

linear programming – A mathematical method of systematically budgeting enterprises to efficiently use available resources.

line plot survey – A survey employing plots as sampling units. Plots of specified size are laid out, usually at regular intervals along parallel survey lines.

lining (hydraulics) – A protective covering over all or part of the perimeter of a reservoir or a conduit to prevent seepage losses, withstand pressure, resist erosion, and reduce friction or otherwise improve conditions of flow.

liquefication – (spontaneous liquefication) The sudden large decrease of the shearing resistance of a cohesionless soil, caused by a collapse of the structure from shock or other type of strain and associated with a sudden but temporary increase in the pore-fluid pressure. It involves a temporary transformation of the material into a fluid mass.

lister – A double plow, the shares of which throw the soil in opposite directions, leaving the field with a series of alternate ridges and furrows. Row crops may be seeded in the bottoms of the furrows or on top of the ridge as they are opened up. When no seed is planted, the operation is sometimes referred to as blank listing.

lithic contact (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States.) – A boundary between soil and continuous, coherent underlying material which has a hardness of 3 or more (Mohs scale). When moist, the underlying material cannot be dug with a spade and chunks will not disperse in water with 15 hours shaking. Example, basalt.

lithification – The process of converting a sedimentary deposit into an indurated rock.

lithology – The study of rocks based on the megascopic examination of samples.

Lithosols – A great soil group of azonal soils characterized by an incomplete solum or no clearly expressed soil morphology and consisting of freshly and imperfectly weathered rock or rock fragments.

litter (forestry) – A surface layer of loose organic debris in forests, consisting of freshly fallen or slightly decomposed organic materials.

livestock – Domestic animals produced or kept primarily for farm, ranch, or market purposes, including beef and dairy cattle, hogs, sheep, goats, and horses.

livestock pond – An impoundment, the principal purpose of which is to supply water to livestock. Includes reservoirs, pits, and tanks.

loam – A soil textural class. See soil texture.

loamy – Intermediate in texture and properties between fine-textured and coarse-textured soils. Includes all textural classes with the word "loam" as a part of the class name, such as clay loam. See loam; soil texture. See particle size classes for family groupings for its use in the Soil Classification System of the National Cooperative Soil Survey in the United States.

loamy coarse sand – See soil texture.

loamy fine sand – See soil texture.

loamy sand – See soil texture.

loamy skeletal – See particle size classes for family groupings.

loamy very fine sand – See soil texture.

loess – Material transported and deposited by wind and consisting of predominantly silt-sized particles.

log chute – A bypass around or through a dam for logs and drift. Syn. log-way.

long-term costs – See fixed costs.

loose – A soil consistency term. See consistence.

loose rock dam – A dam built of rock without the use of mortar; a rubble dam. See rock-fill dam.

Low Humic Gley soils – An intrazonal group of somewhat poorly to poorly drained soils with very thin surface horizons moderately high in organic matter over gray and brown mineral horizons, which are developed under wet conditions.

lysimeter – Device to measure the quantity or rate of water movement through or from a block of soil, usually undisturbed and in situ, or to collect such percolated water for quality analysis.

macronutrient – A chemical element necessary in large amounts (usually greater than 1 part per million in the plant) for the growth of plants, usually applied artifically in fertilizer or liming materials. "Macro" refers to quantity and not the essentiality of the element. See micronutrient.

made land – Areas filled with earth or earth and trash mixed, usually made by or under the control of man. A miscellaneous land type.

Malthusian Theory of Population – Thomas Malthus asserted that man could increase his subsistence only arithmetically, whereas population tended to increase geometrically. Thus, population always tended toward the limit set by subsistence and was contained within that limit by the operation of positive and preventive checks, such as famine, pestilence, and premature mortality.

man-year equivalent – The amount of labor that can be supplied by an able-bodied man in 1 year or its equivalent.

Manning's Formula (hydraulics) – A formula used to predict the velocity of water flow in an open channel or pipeline:

$$V = \frac{1.486\, r^{2/3} s^{1/2}}{n},$$

wherein V is the mean velocity of flow in feet per second; r is the hydraulic radius; s is the slope of the energy gradient or for assumed uniform flow the slope of the channel in feet per foot; and n is the roughness coefficient or retardance factor of the channel lining.

manometer – Instrument that measures fluid pressure by fluid displacement. Can be a differential or U-tube manometer.

manure – The excreta of animals, with or without the admixture of bedding or litter, in varying stages of decomposition.

mapping unit – See soil mapping unit.

marble – A metamorphosed form of limestone or dolomite in which the grains are recrystallized.

margin – The point at which the value of the added output just equals the value of the unit of input that produced it; the point of maximum net return.

marking trees – Selection and indication, usually by blaze or paint spot, of trees to be cut or retained in a cutting operation.

marl – An earthy, unconsolidated deposit formed in freshwater lakes, consisting chiefly of calcium carbonate mixed with clay or other impurities in varying proportions.

marsh – Periodically wet or continually flooded area with the surface not deeply submerged. Covered dominantly with sedges, cattails, rushes, or other hydrophytic plants. Subclasses include freshwater and saltwater marshes. See swamp; miscellaneous land type.

marsh, tidal – A low, flat area traversed by interlacing channels and tidal sloughs and periodically inundated by high tides. Vegetation usually consists of salt-tolerant plants.

masonry dam – A dam built of rock and mortar.

mass diagram – A graphical representation of cumulative quantities, such as the integral of a timeflow curve; an integral curve; each point on the curve is the sum of all preceding quantities considered. The diagram is used extensively in water storage analyses.

master plan – In the past, often defined and considered synonymous with comprehensive plan. More recently considered a component part or functional class of a comprehensive plan, for example, master plan for highways and thoroughfares, master plan for parks and recreation, etc.

mast – Plant fruit, such as acorns, beechnuts, walnuts, and conifer seeds, in a collective sense, especially when used as food by animals.

matrix (geology) – Natural material in which larger particles are embedded.

mattress (engineering) – A blanket of brush, poles, or other material interwoven or otherwise lashed together and placed to cover an area subject to scour, weighted with rock, concrete blocks, or otherwise held in place.

meadow – An area of natural or planted vegetation dominated by grasses and grasslike plants used primarily for hay production.

mean (statistics) – The average of a group of items obtained by adding together all items and dividing by the total number of items used.

mean depth (hydraulics) – Average depth; cross-sectional area of a stream or channel divided by its surface or top width.

mean velocity – Average velocity obtained by dividing the flow rate (discharge) by the cross-sectional area for that given cross-section.

measuring weir – A shaped notch through which water flows are measured. Common shapes are rectangular, trapezoidal, and triangular.

mechanical analysis – See particle size analysis and particle size distribution.

mechanical practices – Soil and water conservation practices that primarily change the surface of the land or that store, convey, regulate, or dispose of runoff water without excessive erosion.

median – The value of the middle item when items are arrayed according to size.

medium texture – Intermediate between fine- and coarse-textured soils, containing moderate amounts of sand, silt, and clay. Includes the following textural classes: very fine sandy loam, loam, silt loam, and silt.

megascopic – Large enough to be distinguished by the naked eye or without the aid of a microscope.

mellow soil – A very soft, very friable, porous soil without any tendency toward hardness or harshness.

mesic – See soil temperature classes for family groupings.

mesophyte – A plant that grows under intermediate moisture conditions.

metamorphic rock – That which has formed in the solid state in response to pronounced changes in temperature, pressure, and chemical environment. The process takes place, in general, deep in the crust of the earth below the zone of weathering and cementation.

mho – The reciprocal of ohm which is a unit of electrical inductance.

micaceous – See soil mineralogy classes for family groupings.

microclimate – The climatic nature of the air space which extends from the surface to a height where the effects of the immediate character of the underlying surface no longer can be distinguished from the general local climate.

micronutrient – A chemical element necessary in only extremely small amounts (less than 1 part per million in the plant) for the growth of plants. "Micro" refers to the amount used rather than to its essentiality. Examples are boron, chlorine, copper, iron, manganese, and zinc. See macronutrient.

microorganisms – Forms of life that are either too small to be seen with the unaided eye or are barely discernible.

microrelief – Minor differences in surface configuration of the land surface.

mine dumps – Areas covered with overburden and other waste materials from ore and coal mines, quarries, and smelters, usually with little or no vegetative cover. A miscellaneous land type.

mineral soil – A soil consisting predominantly of, and having its properties determined predominantly by, mineral matter, usually containing less than 20 percent organic matter but sometimes containing an organic surface layer up to 30 centimeters thick. See organic soil.

mine wash – Water-deposited accumulations of sandy, silty, or clayey material recently eroded in mining operations. It may clog streams and channels and damage land on which it is deposited. A miscellaneous land type.

miner's inch – The rate of discharge through an orifice 1 inch square under a specified head. An old term used in the western United States, now seldom used except where irrigation or mining water rights are so specified. The equivalent flow in cubic feet per second is fixed by state statute. One miner's inch is equivalent to 0.025 cubic foot per second in Arizona, California, Montana, and Oregon; 0.020 cubic foot per second in Idaho, Kansas, Nebraska, New Mexico, North and South Dakota, and Utah; 0.026 cubic foot per second in Colorado; and 0.028 cubic foot per second in British Columbia. See cubic foot per second.

minimum tillage – That amount of tillage required to create the proper soil condition for seed germination, plant establishment, and prevention of competitive growth.

minor element – See micronutrient.

miscellaneous land type – A mapping unit for areas of land that have little or no natural soil or that are too nearly inaccessible for orderly examination or that occur where, for other reasons, it is not feasible to classify the soil. Examples are alluvial land, badlands, made land, marsh, mine dump, mine wash, river wash, rock land, rough broken land, rubble land, scoria land, swamp, urban land. See individual definitions.

mitigation (wildlife) – The reduction or elimination of damages to fish and wildlife resources.

mixed – See soil mineralogy classes for family groupings.

mixed forest – A forest composed of two or more species of trees. In practice, usually a forest in which at least 20 percent are trees of other than the dominant species. Contrast with pure forest.

mode (statistics) – The most frequent or most common value, provided that a sufficiently large number of items are available to give a smooth distribution.

moderately coarse texture – Intermediate between coarse and medium texture and consisting predominantly of coarse particles. In soil textural classification it includes all the sandy loams except the very fine sandy loam. See coarse texture.

moderately fine texture – Intermediate between fine and medium texture and consisting predominantly of intermediate-size (soil) particles or relatively small amounts of fine or coarse particles. In soil textural classification it includes clay loam, sandy clay loam, and silty clay loam. See fine texture.

Mohs' scale of hardness – Relative hardness of minerals ranging from a rating of 1 for the softest (talc) to 10 for the hardest (diamond). Calcite has a hardness of 3 and can be scratched with a copper coin.

moisture volume percentage – The ratio of the volume of water in a soil to the total bulk volume of the soil.

moisture weight percentage – The water content expressed as a percentage of the oven-dry weight of soil.

mole drain – Unlined drain formed by pulling a bullet-shaped cylinder through the soil.

mollic epipedon – See diagnostic horizons.

Mollisols – See soil classification.

monolithic – Of or pertaining to a structure formed from a single mass of stone.

montmorillonite – A hydrous, aluminosilicate clay mineral with 2:1 expanding crystal lattice, that is, with two silicon tetrahedral layers enclosing an aluminum octahedral layer. Considerable expansion may be caused along the C axis by water moving between silica layers of contiguous units.

montmorillonitic – See soil mineralogy classes for family groupings.

moraine – An accumulation of drift, with an initial topographic expression of its own, built within a glaciated region chiefly by the direct action of glacial ice. Examples are ground, lateral, recessional, and terminal moraines.

mottled (soils) – Soil horizons irregularly marked with spots of color. A common cause of mottling is impeded drainage, although there are other causes, such as soil development from an unevenly weathered rock. The weathering of different kinds of minerals may cause mottling.

movable dam – A movable barrier that may be opened in whole or in part, permitting control of the flow of water through or over the dam.

muck – Highly decomposed organic material in which the original plant parts are not recognizable. Contains more mineral matter and is usually darker than peat. See muck soil; peat; peat soil; organic soil materials.

muck soil – 1: An organic soil in which the organic matter is well decomposed (USA usage). 2: A soil containing 20 to 50 percent organic matter.

mulch – A natural or artificial layer of plant residue or other materials, such as sand or paper, on the soil surface.

Munsell color system – A color designation system that specifies the relative degrees of the three simple variables of color: hue, value, and chroma. For example: 10YR 6/4 is a color (of soil) with hue 10YR, value 6, and chroma 4. These notations can be translated into several different systems of color names as desired. See chroma; hue; value.

nappe (hydraulics) – A sheet or curtain of water overfalling a weir or an overfall dam.

national forest – A forest area, usually in hilly or mountainous land, owned by the federal government and administered by the Forest Service for the purposes of watershed protection; timber, water, and wildlife production; recreation; in some areas, limited grazing of livestock; and other associated benefits.

national monument – An area owned by the federal government and administered by the National Park Service for the purpose of preserving and making available to the public a resource of archaeological, scientific, or aesthetic interest.

national park – An area of unusual scenic or historic interest owned by the federal government and administered by the National Park Service primarily for recreation use. The scenery, historic objects, and wildlife are conserved in such a manner that they will be unimpaired for the use of future generations.

native species – A species that is a part of an area's original fauna or flora.

natric horizon – See diagnostic horizons.

natural erosion – See erosion.

natural grassland – An area in which the natural potential plant community is dominated by grasses and grasslike plants. Associated species include forbs and woody plants.

natural revegetation – Natural re-establishment of plants; propagation of new plants over an area by natural processes.

natural scenic area – Area with exceptional scenery, fauna or flora, and geological or mineral interest, with or without minimum development for access.

net duty of water – The amount of water delivered to the land to produce a crop, measured at the point of delivery to the field. Contrast with gross duty of water.

neutral soil – A soil in which the surface layer, at least to normal plow depth, is neither acid nor alkaline in reaction. For most practical purposes, soil with a pH ranging from 6.6 through 7.3. See acid soil; alkaline soil; pH; reaction, soil.

niche (wildlife) – The place in the plant or animal community that a species may occupy.

nitrate reduction – The biochemical reduction of nitrates to the nitrite form.

nitrification – The biological oxidation of ammonium salts to nitrites and the further oxidation of nitrites to nitrates.

nitrogen assimilation – The incorporation of nitrogen compounds into cell substances by living organisms.

nitrogen cycle – The sequence of biochemical changes undergone by nitrogen, wherein it is used by a living organism, liberated upon the death and decomposition of the organism, and converted to its original state of oxidation.

nitrogen fixation – The conversion of elemental nitrogen (N_2) to organic combinations or to forms readily useable in biological processes.

nitrogen-fixing plant – A plant that can assimilate and fix the free nitrogen of the atmosphere with the aid of bacteria living in the root nodules. Legumes with the associated rhizobium bacteria in the root nodules are the most important nitrogen-fixing plants.

nodule – A structure developed on the roots of most legumes and some other plants in response to the stimulus of root-nodule bacteria. Legumes bearing these nodules are nitrogen-fixing plants, utilizing atmospheric nitrogen instead of depending on nitrogen compounds in the soil.

Noncalcic Brown soils – The zonal group of soils with slightly acid, light pinkish or light reddish brown A horizons over light reddish brown or dull red B horizons developed under mixed grass and forest vegetation in a subhumid, wet-dry climate. See horizon, soil; Zonal soil.

nonoperator-landlords – Those who operate none of their land but rent land to others.

nonrenewable – Natural resources once used up are gone forever.

nonsaline-alkali soil – See sodic soil.

nonuniform flow (hydraulics) – Flow in which the mean velocity or cross-sectional area vary at successive channel cross-sections. If the velocity at a given cross-section is constant with time, it is referred to as steady nonuniform flow. If the velocity changes with time at each cross-section, it is known as unsteady nonuniform flow.

normal – A mean or average value established from a series of observations for purposes of comparison, for example, normal precipitation, normal temperature, normal flow.

normal depth – Depth of flow in an open conduit during uniform flow for the given conditions. See uniform flow.

normal erosion – See erosion.

normal forest – A standard with which to compare an actual forest to bring out its deficiencies for sustained-yield management; a forest with normal increment, normal age and size classes, normal composition, and normal stocking.

notch – The opening in a dam or spillway for the passage of water. See weir notch.

no-tillage – A method of planting crops that involves no seedbed preparation other than opening the soil for the purpose of placing the seed at the intended depth. This usually involves opening a small slit or punching a hole into the soil. There is usually no cultivation during crop production. Chemical weed control is normally used. Also referred to as slot planting or zero tillage.

nurse crop – See companion crop.

nurse tree – A tree that protects or fosters the growth of another in youth.

nursery – A place where plants, such as trees, shrubs, vines, and grasses, are propagated for transplanting or for use as stocks for grafting; a planting of young trees or other plants, the young plants being called nursery stock or planting stock.

nutritive ratio – The ratio or proportion between digestible protein and digestible non-nitrogenous nutrients (carbohydrates and fats) in a livestock feed.

observation well – Hole bored to a desired depth below the ground surface, used for observing the water table or piezometric level.

ochric epipedon – See diagnostic horizons.

odd area (wildlife) – A small area of land, such as a bare knob, fence corner, sink hole, blow-out, borrow pit, or an irregularly shaped area, that may be best used to produce wildlife habitat.

ogee – Profile of an overflow dam or spillway shaped like an "S".

ohm – Unit of electrical resistance.

open drain – Natural watercourse or constructed open channel that conveys drainage water.

open range – An extensive grazing area on which the movement of livestock is unrestricted.

operational waste (irrigation) – The water wasted through spillways or otherwise discarded from an irrigation system after having been diverted into it.

opportunity cost – The return to the best alternative use by employing a unit of resource in a given manner.

order – See soil classification.

organic matter – See soil organic matter.

organic soil – A soil that contains a high percentage (greater than 20 or 30 percent) of organic matter in the solum.

organic soil materials (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – 1: Saturated with water for prolonged periods unless artifically drained and having more than 30 percent organic matter if the mineral fraction is more than 50 percent clay, or more than 20 percent organic matter if the mineral fraction has no clay. 2: Never saturated with water for more than a few days and having more than 34 percent organic matter. See soil classification, Histosols.

Kinds of organic materials:

fibric materials – The least decomposed of all the organic soil materials, containing very high amounts of fiber that are well preserved and readily identifiable as to botanical origin. These materials have a bulk density of less than 6¼ pounds per cubic foot and a fiber content (unrubbed) that exceeds two-thirds of the organic volume, more than four-tenths after rubbing. When saturated, the maximum water content of the material ranges from 850 to 3000 percent on an oven-dry basis.

hemic materials – Intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric materials. These materials have a bulk density of 6¼ to 12½ pounds per cubic foot, and fiber content (unrubbed) is between one-third and two-thirds of the organic volume, more than one-tenth after rubbing. When saturated, the maximum water content of the material ranges from 450 to 850 percent on an oven-dry basis.

sapric materials – The most highly decomposed of the organic materials, having the highest bulk density, least amount of plant fiber, and lowest water content at saturation. These materials have a bulk density of more than 12½ pounds per cubic foot and a fiber content (unrubbed) of less than one-third the organic volume. When saturated, the maximum water content of the material averages less than 450 percent on an oven-dry basis.

orogenic – Of or pertaining to mountain building.

ortstein – The organic and sesquioxide cemented subsoil layer in podzols or groundwater podzols. It does not soften appreciably when immersed in water.

outdoor recreation – The use of soil, water, and natural resources, their aesthetic values and productivity, in accordance with the suitability of these resources for providing outdoor leisure-time activities to serve the needs of the people.

outfall – Point where water flows from a conduit, stream, or drain.

outlet – Point of water disposal from a stream, river, lake, tidewater, or artificial drain.

outlet channel – A waterway constructed or altered primarily to carry water from man-made structures, such as terraces, tile lines, and diversions.

overfall – Abrupt change in stream channel elevation; the part of a dam or weir over which the water flows.

overfall dam – A dam constructed to allow water to overflow its crest.

overgrazed range – A range deteriorated from its productive potential due to continued overuse.

overgrazing – Grazing so heavy that it impairs future forage production and causes deterioration through damage to plants or soil or both.

overhaul – Transportation of excavated material beyond a specified haul limit, usually expressed in cubic yard stations (1 cubic yard hauled 100 feet).

overstocked (forestry) – A condition in a stand or forest indicating more trees than normal or that full stocking would require.

overstocking – Placing a number of animals on a given area that will result in overuse at the end of the planned grazing period.

overstory – The portion of the trees in a forest stand forming the upper crown cover. Syn. overwood. Contrast with understory.

overuse – Excessive use of the current year's growth which will result in range deterioration or over-grazing, if continued. Syn. overutilization.

overutilization – See overuse.

oxic horizon – See diagnostic horizons.

oxidation – Combination with oxygen; addition of oxygen or other atom or group; removal of hydrogen or other atom or group.

Oxisols – See soil classification.

palatability – Plant characteristics or conditions that stimulate a selective response by animals.

pan – Horizon or layer in soils that is strongly compacted, indurated, or very high in clay content. See caliche; claypan; duripan; fragipan; hardpan; orstein; petrocalcic horizon.

pan, pressure or induced – A subsurface horizon or soil layer having a high bulk density and a lower total porosity than the soil directly above or below it as a result of pressure applied by normal tillage operations or by other artificial means. Frequently referred to as plow pan, plowsole, tillage pan or traffic pan.

paralithic contact (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – A boundary between soil and continuous coherent underlying material that has a hardness of less than 3 (Mohs scale). When moist, the underlying material can be dug with a spade and chunks will disperse in water with 15 hours shaking. Example, shale. See lithic contact.

parent material (soils) – The unconsolidated, chemically weathered mineral or organic matter from which the solum of soils has developed by pedogenic processes. The C horizon may or may not consist of materials similar to those from which the A and B horizons developed.

parity – Measure of the degree of comparison between farm produce prices or farm incomes and nonfarm prices or nonfarm incomes.

parity ratio – The ratio of the index of prices received by farmers to the parity index.

Parshall measuring flume – See Venturi flume.

partial-duration series – A statistical grouping or graph involving all rates or volumes for a period of record that are greater than some selected minimum value. In contrast, the *Annual Series* is a graph or tabulation in which only the maximum value for each year is included in the series.

particle size – The effective diameter of a particle measured by sedimentation, sieving, or micrometric methods.

particle-size analysis – Determination of the amounts of different particle sizes in a soil sample, usually by sedimentation, sieving, micrometry, or combinations of these methods.

particle-size classes for family groupings (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – Various particle-size classes are applied to arbitrary control sections that vary according to the depth of the soil, presence or absence of argillic horizons, depth to paralithic or lithic contacts, fragipans, duripans, and petrocalcic horizons. No single set of particle-size classes is appropriate as a family grouping for all kinds of soil. The classification tabulated below provides a choice of either seven or eleven particle-size classes. This choice permits relatively fine distinctions in soils if texture is important and broader groupings if texture is not susceptible to precise measurement or if the use of narrowly defined classes produces undesirable groupings.

1. fragmental – Stones, cobbles, gravel, and coarse sand, with fines too few to fill interstices larger than 1 millimeter.
2. sandy-skeletal – More than 35 percent, by volume, coarser than 2 millimeters, with enough fines to fill interstices larger than 1 millimeter; fraction less than 2 millimeters is as defined for particle-size class 5.

3. loamy-skeletal – More than 35 percent, by volume, coarser than 2 millimeters, with enough fines to fill interstices larger than 1 millimeter; fraction less than 2 millimeters is as defined for particle-size class 6.
4. clayey-skeletal – More than 35 percent, by volume, coarser than 2 millimeters, with enough fines to fill interstices larger than 1 millimeter; fraction less than 2 millimeters is as defined for particle-size class 7.
5. sandy – Sands, except very fine sand, and loamy sands, except loamy very fine sand.
6. loamy
   - 6a. coarse-loamy – With less than 18 percent clay and more than 15 percent coarser than very fine sand (including coarse fragments up to 7.5 centimeters).
   - 6b. fine-loamy – With more than 18 percent clay but less than 35 percent clay and more than 15 percent coarser than very fine sand (including coarse fragments up to 7.5 centimeters).
   - 6c. coarse-silty – With less than 18 percent clay and less than 15 percent coarser than very fine sand (including coarse fragments up to 7.5 centimeters).
   - 6d. fine-silty – With more than 18 percent clay and less than 35 percent clay and less than 15 percent coarser than very fine sand (including coarse fragments up to 7.5 centimeters).
7. clayey
   - 7a. fine – With more than 35 percent clay but less than 60 percent clay.
   - 7b. very-fine – With more than 60 percent clay.

particle-size distribution – The amount of the various soil separates in a soil sample, usually expressed as weight percentages. See soil texture; particle-size classes for family groupings.

part-owner-operators – Those who operate land which they own and rent additional land from others.

part-owner-operators-landlords – Those who operate a portion of the land they own and rent out some land.

pasture – An area devoted to the production of forage (introduced or native) and harvested by grazing.

pasture improvement – Any practice of grazing, mowing, fertilizing, liming, seeding, scattering droppings, contour furrowing, or other methods of management designed to improve vegetation for grazing purposes.

pastureland – Land used primarily for the production of adapted domesticated forage plants to be grazed by livestock.

pasture management – The application of practices to keep pasture plants growing actively over as long a period as possible so that they will provide palatable feed of high nutritive value; to encourage the growth of desirable grasses and legumes while crowding out weeds, brush, and inferior grasses. See pasture improvement.

peak discharge – See flood peak.

peak use rate – Maximum periodic rate of consumptive use (evapotranspiration) of water by plants.

peat – Unconsolidated soil material consisting largely of undecomposed or only slightly decomposed organic matter accumulated under conditions of excessive moisture. See organic soil materials.

peat soil – 1: An organic soil in which the organic matter is not yet decomposed or is slightly decomposed (USA usage). 2: An organic soil containing more than 50 percent organic matter. See peat; muck; muck soil.

pebble – See coarse fragments.

ped – A unit of soil structure, such as an aggregate, crumb, prism, block, or granule, formed by natural processes. Contrast with clod, which is formed artificially.

pediment – A gently inclined erosion surface of low relief, typically developed in arid or semiarid regions at the foot of a receding mountain slope. The pediment may be bare or mantled by a thin layer of alluvium in transit to the adjoining basin.

pedon (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – The smallest volume that can be called "a soil." It has three dimensions. It extends downward to the depth of plant roots or to the lower limit of the genetic soil horizons. Its lateral cross section is roughly hexagonal and ranges from 1 to 10 square meters in size depending on the variability in the horizons.

perched water table – See water table, perched.

percolation, soil water – The downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1.0 or less.

perennial plant – A plant that normally lives for 3 or more years.

permafrost – 1: Permanently frozen material underlying the solum. 2: A perennially frozen soil horizon.

permanent pasture – Grazing land occupied by perennial pasture plants or by self-seeding annuals, usually both, which remains unplowed for many years. Contrast with rotation pasture.

permanent wilting percentage – See wilting point.

permeability – Capacity for transmitting a fluid. It is measured by the rate at which a fluid of standard viscosity can move through material in a given interval of time under a given hydraulic gradient.

permeability, soil – The quality of a soil horizon that enables water or air to move through it. The permeability of a soil may be limited by the presence of one nearly impermeable horizon even though the others are permeable.

permissible velocity (hydraulics) – The highest velocity at which water may be carried safely in a channel or other conduit. The highest velocity that can exist through a substantial length of a conduit and not cause scour of the channel. Syn. safe or noneroding velocity.

pesticide – A chemical agent used to control pests.

petrocalcic horizon – See diagnostic horizons.

pH soil – A numerical measure of the acidity or hydrogen ion activity of a soil. The neutral point is pH 7.0. All pH values below 7.0 are acid and all above 7.0 are alkaline.

phase, soil – A subdivision of a soil taxon, usually a soil series or other unit of classification based on characteristics that affect the use and management of the soil but which do not vary sufficiently to differentiate it as a separate soil series. A variation in a property or characteristic, such as degree of slope, degree of erosion, content of stones, texture of the surface, etc. Phases of soil series are the major components of the soil mapping units shown on detailed soil maps in the United States.

phenology – The study of the time of appearance of characteristic periodic events in the life cycles of organisms in nature and how these events are influenced by environmental factors.

phenotype – The appearance of an individual as contrasted with genetic makeup or genotype.

phosphate or potash fixation (soils) – The process or processes by which these two elements are converted from a soluble or exchangeable form to a much less soluble or nonexchangeable form in a soil.

phosphorus fixation – See fixed phosphorus.

phreatic line – The upper surface of the zone of saturation is the phreatic (zero pressure) surface; in cross section this is called the phreatic line.

phreatophyte – A plant deriving its water from subsurface sources; commonly used to describe nonbeneficial, water-loving vegetation.

picnic site – A tract of land substantially developed or modified for picnicking.

piezometer – A tube for measuring the pressure (piezometric) head or potential of a fluid.

piezometric surface – The imaginary surface to which water in a well will rise above an aquifer.

piping – Removal of soil material through subsurface flow channels or "pipes" developed by seepage water.

pit – See dugout pond.

pitot tube – Device for measuring the velocity head of flowing fluid.

pitting – 1: Making shallow pits of suitable capacity and distribution to retain water from rainfall or snowmelt on rangeland or pasture. 2: Small cavities in a surface created by corrosion, cavitation, or subatmospheric pressures.

Planosols – Intrazonal great soil group of soils having one or more horizons abruptly separated from and sharply contrasting to an adjacent horizon because of cementation, compaction, or high clay content. They are formed under forest or grass vegetation in mesothermal to tropical, perhumid to semiarid climates, usually with a fluctuating water table.

plantation, forest – A stand of trees established by planting young trees or by sowing seed.

plant food – The organic compounds elaborated within the plant to nourish its cells. The term is a frequent synonym for plant nutrients, particularly in the fertilizer trade.

plant indicator – See indicator.

planting stock – Young plants, either nursery stock or wildings, for planting.

plant material center – A place where plants are assembled and their value and use in a conservation program is determined. This includes both domestic collections and plant introductions. Plants are assembled; their performance is evaluated; selections are made and increased for field testing; varieties are named and released; and foundation-quality seed and/or stock is produced and distributed to cooperative seed growers and nurseries for commercial production and use.

plant nutrients – The elements or groups of elements taken in by a plant which are essential to its growth and used in elaboration of its food and tissues. Includes nutrients obtained from fertilizer ingredients. See essential element; macronutrients; micronutrients.

plant residue – See crop residue; humus; litter; mor; mull; organic matter.

plant succession – The process of vegetation development whereby an area becomes successively occupied by different plant communities of higher ecological order.

plastic soil – A soil capable of being molded or deformed continuously and permanently by relatively moderate pressure. See consistence.

platy – See soil structure types.

playa – A shallow central basin of a plain where water gathers after a rain and is evaporated.

plow layer – The soil ordinarily moved in tillage; equivalent to surface soil.

plow pan – See pan, pressure or induced.

plow-plant – Plowing and planting a crop in one operation, with no additional seedbed preparation.

plowsole – See pan, pressure or induced.

Podzol – A great soil group of the zonal order consisting of soils formed in cool-temperate to temperate, humid climates under coniferous or mixed coniferous and deciduous forest and characterized particularly by a highly leached, whitish gray (Podzol) A2 horizon. Iron oxide and alumina, and organic matter, have been removed from the A horizon and deposited in the B horizon.

point row – A row which forms an angle with another row instead of paralleling it to the end of the field. A row that "comes to a point," ending part way across the field instead of at the edge of the field.

pollution, water – Any change in the character of water adversely affecting its usefulness.

polypedon (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – Two or more contiguous pedons, all of which are within the defined limits of a single soil series. In early stages of development this was called a soil individual.

poorly graded soil (engineering) – A soil material consisting mainly of particles nearly the same size. Because there is little difference in size of the particles in poorly graded soil material, density usually can be increased only slightly by compaction.

pore space – Total space not occupied by soil particles in a bulk volume of soil, commonly expressed as a percentage. The percent pore space is equal to

$$1 - \frac{\text{bulk density}}{\text{specific gravity}} \times 100$$

porosity – The degree to which the total volume of a soil, sediment, or rock is permeated with pores or cavities, generally expressed as a percentage of the whole volume unoccupied by solid particles. See air porosity; capillary porosity.

post-emergence (crop production) – Application of chemicals, fertilizers, or other materials and operations associated with crop production after the crop has emerged through the soil surface.

potassium fixation – The process of converting exchangeable or water-soluble potassium to moderately soluble potassium, that is, to a form not easily exchanged from the adsorption complex with a cation of a neutral salt solution.

potential plant community – See climax vegetation.

prairie – See natural grassland.

Prairie soils–See Brunizem soils.

pre-emergence (crop production) – Application of chemicals, fertilizers, or other materials and operations associated with crop production before the crop has emerged through the soil surface.

prescribed burning – See controlled burning.

prescribed rights, water – See water rights.

pressure head – See head.

prices-paid index – The index of prices farmers pay for goods and services used for producing farm products and in family living.

prices-received index – An index of average prices received by farmers for 55 of the most important products sold.

primary project benefits – A water resource development term used to describe the value of products and services directly resulting from the project; net of all associated cost incurred in their realization.

priming – 1: The first filling or first seasonal filling of a canal, reservoir, or other structure with water. 2: Starting the flow, as in a pump or siphon.

prismatic soil structure – See soil structure types.

private development (recreation) – Recreation areas established and operated by private entities.

probable maximum precipitation (PMP) – An estimate of the physical upper limit to the amount of precipitation that can fall over a specific area in a given time.

producer (biology) – An organism that can use radiant energy to synthesize organic substances from inorganic materials.

production expenses – Total cash outlays for production, excluding land ownership costs, plus "noncash" outlays, such as depreciation.

productivity, soil – See soil productivity.

project benefits – The sum of primary project benefits and the attributable secondary benefits.

project costs – A term commonly used in connection with water resource development projects. It includes the value of goods and services (land, labor, and material) used for the establishment, maintenance, and operation of a project together with the value of any net-induced adverse effects, whether or not compensated for.

proper grazing use – Grazing ranges and pastures in a manner that will maintain adequate cover for soil protection and maintain or improve the quality and quantity of desirable vegetation.

proper stocking– Stocking the grazing unit to obtain proper grazing use.

protection forest – An area wholly or partly covered with woody growth, managed primarily for its beneficial effects on soil and water conservation rather than for wood or forage production.

pruning (forestry) – The removal of live or dead branches from standing trees, usually the lower branches of young trees, in order to obtain logs with fewer knots when the trees mature. See self-pruning.

public development (recreation) – Recreation areas established and operated by a governmental unit in the public interest.

puddled soil – A dense soil dominated by massive or single-grain structure, almost impervious to air and water. This condition results from handling a soil when it is in a wet, plastic condition so that when it dries it becomes hard and cloddy.

puddling – The act of destroying soil structure. Puddling reduces porosity and permeability. This process is sometimes used to reduce leakage of reservoirs and canals.

pump characteristics – Speed-head-discharge-power relationships for a given pump.

pump drainage – Any drainage system that uses a pump to convey the water to the outlet channel.

pumped well drain – A well sunk into an aquifer from which water is pumped to lower the water table.

pure forest – A forest composed essentially of trees of one species. In practice, a forest in which at least 80 percent of the trees are of one species. Contrast with mixed forest. Syn. pure timber stand.

pure live seed – The product of the percentage of germination plus the hard seed and the percentage of pure seed, divided by 100.

Quadrat – A small plot or sample area, frequently 1 square meter or 1 mil-acre in size.

quicksand – Sand which is unstable because of upward pressure of water.

R horizon – See soil horizon.

radius of influence – See cone of depression.

rain – Water falling in drops condensed from vapor in the atmosphere.

rainfall – A fall of rain; the amount of water that falls as rain expressed in inches in depth.

rainfall excess (hydraulics) – The volume of rainfall that will result in runoff.

rainfall intensity – The rate at which rain is falling at any given instant, usually expressed in inches per hour.

range – 1: All land producing native forage for animal consumption and land that is revegetated naturally or artifically to provide a forage cover that is managed like native vegetation. Generally considered as land that is not cultivated. 2: (wildlife) – The geographic area occupied by an organism.

range condition – The state and health of the range based on what it is naturally capable of producing.

range condition class – One of a series of arbitrary categories used to classify range condition, usually expressed as either excellent, good, fair, or poor.

range condition trend – The direction of change in range condition.

range management – The art and science of planning and directing range use to obtain sustained maximum animal production consistent with perpetuation of the natural resources.

range readiness – The stage of growth of the important palatable plants on the range and the condition of soil which permit grazing without undue compacting of the soil or endangering the ability of the plants to maintain themselves.

range seeding – Establishing adapted plant species on ranges by means other than natural revegetation.

range site – A distinctive kind of rangeland that differs from other kinds of rangeland in its potential to produce native plants.

rating curve – A graphic or sometimes tabular representation of performance or output under a stated series of conditions; for example, a rating curve for a flume shows volume of flow per unit time at various stages or depths of flow.

rating flume – An open conduit built in a channel to maintain a consistent regimen for the purpose of measuring the flow and developing stage-discharge relation.

ration – The amount of feed allotted to a given animal for a 24-hour day. It may be fed at one time or in portions at different times during the day.

ration, balanced – A ration that furnishes the various essential nutrients in such proportion and amounts that it will properly nourish a given animal for one day.

reaction, soil – The degree of acidity or alkalinity of a soil, usually expressed as a pH value. Descriptive terms commonly associated with certain ranges in pH are extremely acid, less than 4.5; very strongly acid, 4.5 – 5.0; strongly acid, 5.1 – 5.5; medium acid, 5.6 – 6.0; slightly acid, 6.1 – 6.5; neutral, 6.6 – 7.3; mildly alkaline, 7.4 – 7.8; moderately alkaline, 7.9 – 8.4; strongly alkaline, 8.5 – 9.0; and very strongly alkaline, more than 9.0.

recession curve (hydraulics) – See depletion curve.

recharge – Process by which water is added to the zone of saturation, as recharge of an aquifer.

recording gage – An automatic instrument for making a graphic record of quantities or conditions, like flow, stage, rainfall, and temperature, in relation to time.

recreation area – An area used for outdoor recreation.

recreation area planting – Establishing grasses, legumes, vines, shrubs, trees, or other plants on recreation areas.

recreation area pruning and thinning – Selectively reducing stand density and trimming woody plants to improve an area for recreation.

recreation area stabilization – Stabilizing recreation areas subject to heavy use by surfacing with suitable materials or by installing needed structures.

recreation development – A created or improved outdoor area for the enjoyment of outdoor recreation.

recreation enterprise – A private outdoor recreation business operated for profit.

recreation land – Land and water used or usable primarily as sites for outdoor recreation facilities and activities.

recreation land grading and shaping – Altering the surface of land to meet the requirements of recreation facilities.

recreation resource – Land and water areas and their natural attributes, with or without man-made facilities, that provide opportunities for outdoor recreation.

recreation site – Land and water used primarily for recreation facility locations.

recreation trail and walkway – A pathway prepared especially for pedestrian, equestrian, and cycle travel.

recurrence interval – The average time interval between actual occurrences of an event at a given or greater magnitude. See frequency.

Red Desert soils – A zonal group of soils having light reddish brown, friable soil over a reddish brown or dull red, heavy horizon grading into an accumulation of carbonate of lime; found in warm-temperate and tropical deserts and characterized by more or less scant desert shrub vegetation.

Reddish Brown soils – A zonal group of soils with a light brown surface horizon of a slightly reddish cast which grades into dull reddish brown or red material heavier than the surface soil, then into a horizon of whitish or pinkish lime accumulation; developed under shrub and short-grass vegetation of warm-temperate to tropical regions of semiarid climate.

Reddish Brown Lateritic soils (of U.S.) – A zonal group of soils with dark reddish brown granular surface soils, red friable clay B horizons, and red or reticulately mottled lateritic parent material, developed under humid tropical climate with wet-dry seasons and tropical forest vegetation.

reducing environment – An environment conducive to the removal of oxygen. It is also expressed by showing an increase in negative valence. It represents the addition of electrons to an atom or ion.

Red-Yellow Podzolic soils – A group of well-developed, well-drained acid soils having thin (A1) horizons over light-colored, bleached (A2) horizons over a red, yellowish red, or yellow and more clayey (B) horizon containing illuviated silicate clay.

reforestation – Restocking an area with forest trees.

refuge (wildlife) – An area designated for the protection of wild animals, within which hunting and fishing is either prohibited or strictly controlled.

regime (hydraulics) – Applies to streams that make at least part of their boundaries from their transported load and part of their transported load from their boundaries, carrying out the process at different places and times in the stream in a balanced or alternating manner that permits unlimited growth or removal of boundaries.

regimen – The stability of a stream and its channel. A river or canal is "in regimen" if its channel has reached a stable form as the result of its flow characteristics.

regolith – The layer or mantle of loose, noncohesive or cohesive rock material, of whatever origin, that nearly everywhere forms the surface of the land and rests on bedrock. It comprises rock waste of all sorts; volcanic ash; glacial drift; alluvium; wind-blown deposits; accumulations of vegetation, such as peat; and soil.

Regosol – Any soil of the azonal order without definite genetic horizons and developing from or on deep, unconsolidated, soft mineral deposits, such as sands, loess, or glacial drift.

regression – A statistical method for studying and expressing the change in one variable associated with and dependent on changes in another related variable or set of variables.

relief drain – A drain designed to remove water from the soil in order to lower the water table and reduce hydrostatic pressure.

relief well – Well, pit, or bore penetrating the water table to relieve hydrostatic pressure by allowing flow from the aquifer.

Rendzina – A great soil group of the intrazonal order and calcimorphic suborder consisting of soils with brown or black friable surface horizons underlain by light gray to pale yellow calcareous material, developed from soft, highly calcareous parent material under grass or mixed grasses and forest in humid to semiarid climates.

renewable natural resources – Can be restored and improved to produce the things man needs.

reservoir – Impounded body of water or controlled lake in which water is collected or stored.

residual material – Unconsolidated and partly weathered mineral materials accumulated by disintegration of consolidated rock in place.

residual soil – A soil formed in material weathered from bedrock without transportation from the original location. See residual material.

resource area – See land resource area.

resource region – See land resource region.

resource unit – See land resource unit.

rest-rotation grazing – A form of deferred-rotation grazing in which at least one grazing unit is rested from grazing for a full year.

retarding pool – The reservoir space allotted to the temporary impoundment of floodwater, its upper limit being the elevation of the crest of the emergency spillway.

retention – The amount of precipitation on a drainage area that does not escape as runoff. It is the difference between total precipitation and total runoff.

return flow – That portion of the water diverted from a stream which finds its way back to the stream channel either as surface or underground flow.

revetment – Facing of stone or other material, either permanent or temporary, placed along the edge of a stream to stabilize the bank and to protect it from the erosive action of the stream.

rhizobia – The bacteria capable of living in symbiotic relationship with leguminous plants in nodules on the roots, the association usually being capable of fixing nitrogen (from the generic name ***Rhizobium***).

rhizome – A horizontal underground stem, usually sending out roots and above-ground shoots at the nodes.

rill – A small, intermittent water course with steep sides, usually only a few inches deep and, hence, no obstacle to tillage operations.

rill erosion – See erosion.

riparian land – Land situated along the bank of a stream or other body of water.

riparian rights – The rights of an owner whose land abuts water. They differ from state to state and often depend on whether the water is a river, lake, or ocean. See water rights.

riprap – Broken rock, cobbles, or boulders placed on earth surfaces, such as the face of a dam or the bank of a stream, for protection against the action of water (waves); also applied to brush or pole mattresses, or brush and stone, or other similar materials used for soil erosion control.

river basin – The United States has been divided into 20 major water resource regions (river basins). See drainage basin.

river basin plan – A plan for development of water and related land resources to make the best use of such resources to meet the basin needs and make the greatest long-term contribution to the economic growth and social well-being of the people of the basin and the Nation.

riverwash – Barren alluvial land, usually coarse-textured, exposed along streams at low water and subject to shifting during normal high water. A miscellaneous land type.

roadside erosion control – See highway erosion control.

rock-fill dam – A dam composed of loose rock usually dumped in place, often with the upstream part contructed of handplaced or derrick-placed rock and faced with rolled earth or with an impervious surface of concrete, timber, or steel.

rock land – Areas containing many rock outcrops and shallow soils. Rock outcrops usually occupy from 25 to 90 percent of the area. A miscellaneous land type.

root nodule – A hypertrophy formed on the roots of leguminous plants, caused by the symbiotic nitrogen-fixing bacteria.

root zone – The part of the soil that is penetrated or can be penetrated by plant roots.

rotation – The period of years required to establish and grow woodland tree crops to a specified condition of maturity. See crop rotation.

rotation-deferred grazing – See deferred-rotation grazing.

rotation grazing – Grazing two or more pastures or parts of a range in regular order, with definite recovery periods between grazing periods. Where only two fields are involved, sometimes called alternate grazing. Contrast with continuous grazing.

rotation irrigation – A system by which each irrigator receives his allotted quantity of water, not at a continuous rate, but at stated intervals. For example, a number of irrigators receiving water from the same lateral may agree among themselves to rotate the water, each taking the entire flow in turn for a limited period.

rotation pasture – A cultivated area used as a pasture 1 or more years as a part of crop rotation. Contrast with permanent pasture.

row crop – A crop planted in rows, normally to allow cultivation between rows during the growing season.

roughage – Feed with high fiber content and low total digestible nutrients, such as hay and stover.

rough broken land – Land with very steep topography and numerous intermittent drainage channels, usually covered with vegetation. See miscellaneous land type and badlands.

roughness coefficient (hydraulics) – A factor in velocity and discharge formulas representing the effect of channel roughness on energy losses in flowing water. Manning's "n" is a commonly used roughness coefficient.

rubble land – Land areas with 90 percent or more of the surface covered with stones and boulders. A miscellaneous land type.

runoff (hydraulics) – That portion of the precipitation on a drainage area that is discharged from the area in stream channels. Types include surface runoff, groundwater runoff, or seepage.

runoff plots – Areas of land, usually small, arranged so the portion of rainfall or other precipitation flowing off and perhaps carrying soluble materials and soil may be measured. Usually the flow from runoff plots includes only surface flow.

rural beautification – Creating, enhancing, and preserving natural beauty in the countryside.

rural cottage, camp, and home sites – Lands used for seasonal homes or vacation cottages; permanent campsites for groups, organizations, or clubs; or permanent home locations.

sacrifice area – A relatively small area of land in a grazing unit that may still be overused after practical measures for securing uniform grazing distribution have been installed.

safe velocity (hydraulics) – See permissable velocity.

safe yield – The rate at which water can be withdrawn from a groundwater basin (aquifer) without depleting the supply to such an extent that undesirable effects result. It depends on rate of recharge, change in water quality, and economics.

saline-alkali soil – 1: A soil containing sufficient exchangeable sodium to interfere with the growth of most crop plants and containing appreciable quantities of soluble salts. The exchangeable-sodium percentage is greater than 15, the conductivity of the saturation extract greater than 4 millimhos per centimeter (25 degrees centigrade), and the pH is usually 8.5 or less in the saturated soil. 2: A saline-alkali soil has a combination of harmful quantities of salts and either a high alkalinity or high content of exchangeable sodium, or both, so distributed in the profile that the growth of most crop plants is reduced. Often called saline-sodic soil.

saline soil – A nonalkali soil containing sufficient soluble salts to impair its productivity but not containing excessive exchangeable sodium. This name was formerly applied to any soil containing sufficient soluble salts to interfere with plant growth commonly greater than 3,000 parts per million.

saltation – Particle movement in water or wind where particles skip or bounce along the stream bed or soil surface.

salting – 1: Providing salt as a mineral supplement for animals. 2: Placing salt on the range in such a manner as to improve distribution of livestock.

sample plot – An area of land, usually small, used for measuring or observing performance under existing or applied treatments. It may be temporary or permanent.

sample, random – A sample drawn without bias from a population in which every item has an equal chance of being drawn.

sample, representative – A sample drawn in such a way that it gives a true value for the population from which it is drawn.

sand – 1: A soil particle between 0.05 and 2.0 millimeters in diameter. 2: Any one of five soil separates: very coarse sand, coarse sand, medium sand, fine sand, and very fine sand. See soil separates. 3: A soil textural class. See soil texture.

sand bearing method – Method of testing the crushing strength of drain tile in which the tile is bedded in sand according to ASTM specifications.

sand lens – Lenticular band of sand in distinctly sedimentary banded material.

sand trap (irrigation, drainage) – A device, often a simple enlargement in a ditch or conduit, for arresting the heavier particles of sand and silt carried by the water. Means for removing such material may be included.

sandy – See coarse-textured and particle-size classes for family groupings.

sandy clay – A soil textural class. See soil texture.

sandy clay loam – A soil textural class. See soil texture.

sandy loam – A soil textural class. See soil texture.

sandy-skeletal – See particle-size classes for family groupings.

sapric materials – Se organic soil materials.

saturate – 1: To fill all the voids between soil particles with liquid. 2: To form the most concentrated solution possible under a given set of physical conditions in the presence of an excess of the substance.

saturated – The condition of sediment, soil, or rock in which interstices and other voids are filled with water or other liquid.

saturation point – 1: That point at which a soil or aquifer will no longer absorb any amount of water without losing an equal amount. 2: (wildlife) – The maximum density under which a species will normally live.

sausage dam – A dam of loose rock which has been wrapped with wire into cylindrical bundles which are laid in a horizontal or vertical position.

savanna (savannah) – A grassland with scattered trees, either as individuals or clumps. Often a transitional type between true grassland and forest.

sawtimber – Trees with logs suitable in size and quality for the production of lumber.

scale (forestry) – 1: To estimate the content of sound wood in a log or bolt or group of logs or bolts using a given unit of measure or weight. 2: The estimated content of a log or group of logs or bolts.

scalping – Removal of sod or other vegetation in spots or strips.

scarify – To abrade, scratch, or modify the surface, for example, to scratch the impervious seed coat of hard seed or to break the surface of the soil with a narrow-bladed implement.

scour – To abrade and wear away. Used to describe the wearing away of terrace or diversion channels or stream beds.

scouring sluice – An opening in a dam controlled by a gate through which the accumulated silt, sand, and gravel may be ejected.

seasonal grazing – Grazing restricted to a specific season.

secondary benefits – The values over and above the immediate products or services of a water resource development project. These result from activities "stemming from" or induced by a project.

second-foot – See cubic foot per second.

second-growth forest – A forest originating naturally after removal of the old stand by cutting, fire, or other cause. Contrast with virgin forest.

sediment – Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

sediment discharge – The quantity of sediment, measured in dry weight or by volume, transported through a stream cross-section in a given time. Sediment discharge consists of both suspended and load and bedload.

sediment grade sizes – Measurements of sediment and soil particles that can be separated by screening. A committee on sedimentation of the National Research Council established a classification of textural grade sizes for standard use.

sediment load – See sediment discharge.

sediment pool – The reservoir space allotted to the accumulation of submerged sediment during the life of the structure.

sedimentary rocks – Formed by lithification of sediments, mechanical, chemical, or organic. Two broad categories are clastic and chemical.

seedbed – The soil prepared by natural or artificial means to promote the germination of seed and the growth of seedlings.

seeding, direct (forestry) – A method of establishing a stand of trees artificially by sowing seed. In broadcast seeding seed is sown over the entire area. Partial seeding may be done in strips, furrow rows, trenches, or in seed spots.

seed inoculation – The process of adding microorganisms to seed, used frequently to designate the treatment of leguminous seed with symbiotic nitrogen-fixing bacteria (rhizobia).

seedling – A young plant grown from seed.

seed purity – The percentage of the desired species in relation to the total quantity, including other species, weed seed, and foreign matter.

seed tree – A tree that produces seed, usually superior trees left standing at the time of cutting to produce seed for reforestation.

seepage – 1: Water escaping through or emerging from the ground along an extensive line or surface as contrasted with a spring where the water emerges from a localized spot. 2: The process by which water percolates through the soil. 3: (percolation) The slow movement of gravitational water through the soil.

selective cutting (forestry) – A system of cutting in which single trees, usually the largest, or small groups of such trees are removed to encourage reproduction under the remaining stand and in the openings. Contrast with clear cutting. See harvest cutting, improvement cutting.

selective grazing – The tendency for livestock and other grazing animals to graze certain plants in preference to others.

self-mulching soil – A soil with a high shrink-swell potential in the surface layer so that it cracks into a granular mulch when it dries.

self-pruning – The natural death and fall of branches from live trees due to causes such as light and food deficiencies, decay, insect attack, snow, and ice. Syn. natural pruning.

semiarid – A term applied to regions or climates where moisture is normally greater than under arid conditions but still definitely limits the growth of most crops. Dryland farming methods or irrigation generally are required for crop production. The upper limit of average annual precipitation in the cool semiarid regions is as low as 15 inches, whereas in tropical regions it is as high as 45 or 50 inches. Contrast with arid.

separate, soil – See soil separate.

series – See soil classification.

settling basin –An enlargeent in the channel of a stream to permit the settling of debris carried in suspension.

shaly – An adjective incorporated into the soil textural class designations of horizons when the soil mass contains between 15 and 90 percent by volume of shale fragments. See shale fragment as defined under coarse fragments.

sharecropper – Provincial term used in the South to denote a person who provides labor and equipment while the landlord furnishes land, buildings, cash expenses, and finances the family until harvest.

sharp-crested weir – A notch cut in a relatively thin plate and having a sharp edge on the upstream side of the crest, used for measuring water.

shear – A distortion, strain, or failure producing a change in form, usually without change in volume, in which parallel layers of a body are displaced in the direction of their line of contact.

shear strength – The maximum resistance of a soil to shearing stresses.

sheet erosion – See erosion.

sheet flow – Water, usually storm runoff, flowing in a thin layer over the ground surface. Syn. overland flow.

sheet piling – A diaphragm made of meshing or interlocking members of wood, steel, concrete, or other material, driven individually, used to form an obstruction to percolation, prevent movement of material, stabilize foundations, and build coffer dams.

shelterbelt – A wind barrier of living trees and shrubs established and maintained for protection of farm fields. Syn. windbreak.

shooting preserve – An area devoted to the shooting of pen-reared game under controlled conditions.

short-term costs – See variable costs.

shrink-swell potential – Susceptibility to volume change due to loss or gain in moisture content.

shrub – A woody perennial plant differing from a perennial herb by its more woody stems and from a tree by its low stature and habit of branching from the base. There is no definite line between herbs and shrubs or between shrubs and trees; all possible intergradations occur.

side slopes (engineering) – The slope of the sides of a canal, dam, or embankment. It is customary to name the horizontal distance first, as 1.5 to 1, or frequently, 1½:1, meaning a horizontal distance of 1.5 feet to 1 foot vertical.

Sierozem – A zonal great soil group consisting of soils with pale grayish A horizons grading into calcareous material at a depth of 1 foot or less, formed in temperate to cool, arid climates under a vegetation of desert plants, short grass, and scattered brush.

significant (statistics) – A term applied to differences, correlations, etc., to indicate that they are probably not due to chance alone. Significant ordinarily indicates a probability of not less than 95 percent, while highly significant indicates a probability of not less than 99 percent.

silage – A crop that has been preserved in a moist succulent condition by partial fermentation. Chief silage crops are corn, sorghums, and various legumes and grasses.

siliceous – See soil mineralogy classes for family groupings.

silt – 1: A soil separate consisting of particles between 0.05 and 0.002 millimeter in equivalent diameter. See soil separates. 2: A soil textural class. See soil texture.

silting – See sediment.

silt loam – A soil textural class containing a large amount of silt and small quantities of sand and clay. See soil texture.

silty clay – A soil textural class containing a relatively large amount of silt and clay and a small amount of sand. See soil texture.

silty clay loam – A soil textural class containing a relatively large amount of silt, a lesser quantity of clay, and a still smaller quantity of sand. See soil texture.

single grain – Lack of soil structure in incoherent materials. See soil structure grades.

sink – Depression in the land surface; a negative potential area, as in a source and a sink.

sinking fund – A certain sum regularly set aside by a debtor for the payment of the principal on a debt.

siphon (hydraulics) – A closed conduit, a part of which rises above the hydraulic grade line, utilizing atmospheric pressure to cause the flow of water.

site (ecology) – 1: An area considered for its ecological factors with reference to capacity to produce vegetation; the combination of biotic, climatic, and soil conditions of an area. 2: An area sufficiently uniform in soil, climate, and natural biotic conditions to produce a particular climax vegetation.

site index (forestry) – A numerical expression commonly accepted as an indicator of the quality or timber productivity of a site. It is an expression of the height-age relationship of the tallest trees (dominants and codominants) in normal stands at some designated age, such as 50 years.

skimming – Diverting surface water by shallow overflow to avoid diverting sediment or debris carried as bedload.

slash – The branches, bark, tops, cull logs, and broken or uprooted trees on the ground after logging.

slick spots – Small areas in a field that are slick when wet due to a high content of alkali or exchangeable sodium.

slip – The downslope movement of a soil mass under wet or saturated conditions; a microlandslide that produces a microrelief in soils.

slope – Degree of deviation of a surface from the horizontal, usually expressed in percent or degrees.

slope characteristics – Slopes may be characterized as concave (decrease in steepness in lower portion), uniform, or convex (increase in steepness at base). Erosion is strongly affected by shape, ranked in order of increasing erodibility from concave to uniform to convex.

slough – Wet or marshy area.

sluice – Channel serving to drain off surplus water from behind a flood gate; conduit for carrying water at high velocity; an opening in a structure for passing debris. Also, to cause water to flow at high velocities for ejecting debris.

slump test – A method of measuring the workability or, more properly, the consistency of concrete mixtures.

snow course – A course laid out and permanently marked on the drainage area of a stream, along which the snow is sampled at appropriate times to determine its depth and density for the purpose of forecasting subsequent runoff.

snow density – The water content of snow expressed as a percentage by volume. In snow surveys, the ratio of the scale reading (inches of water) to the length of the snow core, in inches.

snow fence – A fence of slat and wire or other material used in winter to intercept drifting snow, thus protecting roads, railways, and other areas from snowdrifts. Also used to impound snow where melting in place adds to soil moisture.

snowhedge – A planting of shrubs or other plants to intercept drifting snow. Syn. snowbreak; snow catch.

snow sample – A core taken from the snow mantle on a snow course from which the depth and density may be determined.

snow sampler – The equipment, consisting essentially of light-weight, jointed tubes, used for taking snow samples to determine the water content of the snowpak.

snow surveys – A set of measurements of the depth and density of snow, usually made to determine the water stored on a drainage basin in the form of snow as an aid to predicting the subsequent runoff.

sod grasses – Stoloniferous or rhizomatous grasses that form a sod or turf.

sodic soil – 1: A soil that contains sufficient sodium to interfere with the growth of most crop plants. 2: A soil in which the exchangeable-sodium percentage is 15 or more. Sodic soils because of dispersion of the organic matter have been called "black alkali" soils; sometimes also called nonsaline-alkali soils.

soil – 1: The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. 2: The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material, climate (including moisture and temperature effects), macro- and micro-organisms, and topography, all acting over a period of time and producing a product–soil–that differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics. 3: A kind of soil is the collection of soils that are alike in specified combinations of characteristics. Kinds of soil are given names in the system of soil classification. The terms "the soil" and "soil" are collective terms used for all soils, equivalent to the word "vegetation" for all plants.

soil alkalinity – The degree or intensity of alkalinity of a soil, expressed by a value greater than 7.0 on the pH scale.

soil association – 1: A group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a geographic region, comparable to plant associations in many ways. Sometimes called "natural land type." 2: A mapping unit used on reconnaissance or generalized soil maps in which two or more defined taxonomic units occurring together in a characteristic pattern are combined because the scale of the map or the purpose for which it is being made does not require delineation of the individual soils.

soil auger – A tool for boring into the soil and withdrawing a small sample for field or laboratory observation. Soil augers may be classified as (1) those with worm-type bits, uninclosed, or (2) those with worm-type bits inclosed in a hollow cylinder.

soil classification – The systematic arrangement of soils into classes in one or more categories or levels of classification for a specific objective. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties. The categories of the system used in the United States since 1966 are briefly discussed below. The relationship between the orders of the present system and approximate equivalents of the previous system used in the United States are shown in table 2.

order – The category at the highest level of generalization in the soil classification system. The properties selected to distinguish the orders are reflections of the degree of horizon development and the kinds of horizons present. The 10 orders are:

Alfisols – Soils with gray to brown surface horizons, medium to high supply of bases, and B horizons of illuvial clay accumulation. These soils form mostly under forest or savannah vegetation in climates with slight to pronounced seasonal moisture deficit.

Aridisols – Soils with pedogenic horizons, low in organic matter, that are never moist as long as 3 consecutive months. They have an ochric epipedon that is normally soft when dry or that has distinct structure. In addition, they have one or more of the following diagnostic horizons: argillic, natric, cambic, calcic, petrocalcic, gypsic or salic or a duripan.

Entisols – Soils that have no diagnostic pedogenic horizons. They may be found in virtually any climate on very recent geomorphic surfaces, either on steep slopes that are undergoing active erosion or on fans and floodplains where the recently eroded materials are deposited. They may also be on older geomorphic surfaces if the soils have been recently disturbed to such depths that the horizons have been destroyed or if the parent materials are resistant to alternation, as is quartz.

Histosols – Soils formed from organic soil materials.

Inceptisols – Soils that are usually moist with pedogenic horizons of alteration of parent materials but not of illuviation. Generally, the direction of soil development is not yet evident from the marks left by the various soil-forming processes or the marks are too weak to classify in another order.

Mollisols – Soils with nearly black, organic-rich surface horizons and high supply of bases. These are soils that have decomposition and accumulation of relatively large amounts of organic matter in the presence of calcium. They have mollic epipedons and base saturation greater than 50 percent (NH_4OAc) in any cambic or argillic horizon. They lack the characteristics of Vertisols and must not have oxic or spodic horizons.

Oxisols – Soils with residual accumulations of inactive clays, free oxides, kaolin, and quartz. They are mostly in tropical climates.

Spodosols – Soils wih illuvial accumulations of amorphous materials in subsurface horizons. The amorphous material is organic matter and compounds of aluminum and usually iron. These soils are formed in acid mainly coarse-textured materials in humid and mostly cool or temperate climates.

Ultisols – Soils that are low in supply of bases and have subsurface horizons of illuvial clay accumulation. They are usually moist, but during the warm season of the year, some are dry part of the time. The balance between liberation of bases by weathering and removal by leaching is normally such that a permanent agriculture is impossible without fertilizers or using shifting cultivation.

Vertisols – Clayey soils with high shrink-swell potential that have wide, deep cracks when dry. Most of these soils have distinct wet and dry periods throughout the year.

suborder – This category narrows the ranges in soil moisture and temperature regimes, kinds of horizons, and composition, according to which of these is most important. Moisture and/or temperature or soil properties associated with them are used to define suborders of Alfisols, Mollisols, Oxisols, Ultisols, and Vertisols. Kinds of horizons are used for Aridisols, composition for Histosols and Spodosols, and combinations for Entisols and Inceptisols. Some of the more important suborders in the United States are listed below; they are listed alphabetically within the respective orders.

Alfisols

- **Aqualfs** – Alfisols seasonally saturated with water.
- **Boralfs** – Alfisols that are cool or cold.
- **Udalfs** – Alfisols in moist, warm-temperate climates.
- **Ustalfs** – Alfisols in warm climates that are intermittently dry for long periods during the year.
- **Xeralfs** – Alfisols in warm climates that are continuously dry for long periods in the summer but moist in the winter.

Aridisols

- **Argids** – Aridisols with horizons of clay accumulation.
- **Orthids** – Aridisols without horizons of clay accumulation.

Entisols

- **Aquents** – Entisols permanently or seasonally saturated with water.
- **Orthents** – Entisols with loamy or clayey textures.
- **Psamments** – Entisols with sandy textures.

Histosols

- **Fibrists** – Histosols largely undecomposed fibrous organic materials.
- **Hemists** – Histosols intermediate between Fibrists and Saprists in decomposition of organic materials.
- **Saprists** – Histosols largely decomposed organic materials.

Inceptisols

- **Andepts** – Inceptisols with large amounts of amorphous or vitric pyroclastic materials.
- **Aquepts** – Inceptisols seasonally saturated with

Table 2. The new comprehensive soil classification system with the approximate equivalents under the soil classification system of the National Cooperative Soil Survey.

Present Order	Approximate equivalents
1. Entisols	Azonal soils and some Low-Humic Gley soils.
2. Vertisols	Grumusols
3. Inceptisols	Ando, Sol Brun Acide, some Brown Forest, Low-Humic Gley, and Humic Gley soils
4. Aridisols	Desert, Reddish Desert, Sierozem, Solonchak, some Brown and Reddish Brown soils, and associated Solonetz
5. Mollisols	Chestnut, Chernozem, Brunizem (Prairie), Rendzina, some Brown, Brown Forest, and associated Solonetz and Humic Gley soils
6. Spodosol	Podzols, Brown Podzolic soils, and Ground-water Podzols
7. Alfisols	Gray Brown Podzolic, Gray Wooded soils, Non-calcic Brown soils, Degraded Chernozem, and associated Planosols and some Half-Bog soils
8. Ultisols	Red Yellow Podzolic soils, Reddish Brown Lateritic soils of the United States, and associated Planosols and Half-Bog soils
9. Oxisols	Laterite soils, Latosols
10. Histosols	Bog soils

Source: Soil Survey Staff, Soil Conservation Service, U. S. Department of Agriculture. 1960. *Soil classification: a comprehensive system – 7th approximation.* U. S. Government Printing Office, Washington, D.C. p. 13.

water.

Ochrepts – Inceptisols that have thin or light-colored surface horizons with little organic matter and altered subsurface horizons.

Umbrepts – Inceptisols with thick, dark-colored surface horizons rich in organic matter and altered subsurface horizons.

Mollisols

Aquolls – Mollisols seasonally saturated with water.

Borolls – Mollisols that are cool or cold.

Udolls – Mollisols in moist, warm-temperate climates.

Ustolls – Mollisols that are intermittently dry for long periods during the warm season of the year.

Xerolls – Mollisols that are continuously dry for long periods during the warm season of the year.

Spodosols

Aquods – Spodosols seasonally saturated with water.

Orthods – Spodosols with subsurface accumulations of iron, aluminum, and organic matter.

Ultisols

Aquults – Ultisols seasonally saturated with water.

Humults – Ultisols with high or very high organic-matter content.

Udults – Ultisols with low organic-matter content in moist, warm climates.

Xerults – Ultisols with low to moderate organic-matter content, continuously dry for long periods in the summer but moist in the winter.

Vertisols

Uderts – Vertisols that crack open for only short periods, less than a total of 3 months in a year.

Usterts – Vertisols in which cracks open and close more than once during the year but do not remain open continuously throughout the year.

great group – The classes in this category contain soils that have the same kind of horizons in the same sequence and have similar moisture and temperature regimes. Exceptions to the horizon sequences are made for horizons near the surface that may get mixed or lost by erosion if plowed.

subgroup – The great groups are subdivided into subgroups that show the central properties of the great group, intergrade subgroups that show properties of more than one great group, and other subgroups for soils with atypical properties that are not characteristic of any great group.

family – Families are defined largely on the basis of physical and mineralogic properties of importance to plant growth.

series – The soil series is a group of soils having horizons similar in differentiating characteristics and arrangement in the soil profile, except for texture of the surface portion, or if genetic horizons are thin or absent, a group of soils that, within defined depth limits, is uniform in all soil characteristics diagnostic for series.

soil complex – A mapping unit used in detailed soil surveys where two or more defined taxonomic units are so intimately intermixed geographically that it is undesirable or impractical, because of the scale being used, to separate them. A more intimate mixing of smaller areas of individual taxonomic units than that described under soil association.

soil conditioner – Any material added to a soil for the purpose of improving its physical condition.

soil-conserving crops – Crops that prevent or retard erosion and maintain or replenish rather than deplete soil organic matter.

soil correlation – The process of defining, mapping, naming, and classifying the kinds of soils in a specific soil survey area, the purpose being to insure that soils are adequately defined, accurately mapped, and uniformly named in all soil surveys made in the United States. Also concerned with the standards and techniques for describing soils and with the application and development of soil classification.

soil creep – See creep.

soil-depleting crops – Crops that under the usual management tend to deplete nutrients and organic matter in the soil and permit deterioration of soil structure.

soil erosion – The detachment and movement of soil from the land surface by wind or water. See gully erosion; rill erosion; sheet erosion; splash erosion; wind erosion.

soil fertility – See fertility, soil.

soil-formation factors – The variables, usually interrelated natural agencies, active in and responsible for the formation of soil. The factors are usually grouped as follows: parent material, climate, organisms, topography, and time. Many people believe that activities of man in his use and manipulation of soil becomes such an important influence on soil formation that he should be added as a sixth variable. Others consider man as an organism.

soil fumigation – Treatment of the soil with volatile or gaseous substances that penetrate the soil mass and kill one or more forms of soil organisms.

soil genesis – **1**: The mode of origin of the soil with special reference to the processes or soil-forming factors responsible for the development of the solum or true soil from the unconsolidated parent material. **2**: A division of soil science concerned with soil genesis.

soil granule – A cluster of soil particles behaving as a unit in soil structure. See granular soil.

soil horizon – A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics, such as color, structure, texture, consistence, kinds and numbers of organisms present, degree of acidity or alkalinity, etc. Table 3 lists the designations and properties of the major soil horizons. Few if any soils have all of these horizons well developed, but every soil has some of them.

soil improvement – The processes for, or the results of, making the soil more productive for growing plants by drainage, irrigation, addition of fertilizers and soil amendments, and the like.

soil individual – See polypedon.

soil loss equation – See universal soil loss equation.

soil loss tolerance – The maximum average annual soil loss in tons per acre per year that should be permitted on a given soil.

soil management – The sum total of all tillage operations, cropping practices, fertilizer, lime, and other treatments conducted on, or applied to, a soil for the production of plants.

soil map – A map showing the distribution of soil types or

Table 3. Designations and properties of major soil horizons.

Horizon designation	Description
0	Organic horizons of mineral soils. Horizons (i) formed or forming in the upper part of mineral soils above the mineral part: (ii) dominated by fresh or partly decomposed organic material; and (iii) containing more than 30 percent organic matter if the mineral fraction is more than 50 percent clay, or more than 20 percent organic matter if the mineral fraction has no clay. Intermediate clay content requires proportional organic-matter content.
01	Organic horizons in which essentially the original form of most vegetative matter is visible to the naked eye. The 01 corresponds to the L (litter) and some F (fermentation) layers in forest soils designations and to the horizon formerly called Aoo.
02	Organic horizons in which the original form of most plant or animal matter cannot be recognized with the naked eye. The 02 corresponds to the H (humus) and some F (fermentation) layers in forest soils designations and to the horizon formerly called Ao.
A	Mineral horizons consisting of (i) horizons of organic-matter accumulation formed or forming at or adjacent to the surface; (ii) horizons that have lost clay, iron, or aluminum with resultant concentration of quartz or other resistant minerals of sand or silt size; or (iii) horizons dominated by (i) or (ii) above but transitional to an underlying B or C.
A1	Mineral horizons, formed or forming at or adjacent to the surface, in which the feature emphasized is an accumulation of humified organic matter intimately associated with the mineral fraction.
A2	Mineral horizons in which the feature emphasized is loss of clay, iron, or aluminum, with resultant concentration of quartz or other resistant minerals in sand and silt sizes.
A3	A transitional horizon between A and B, dominated by properties characteristic of an overlying A1 or A2 but having some subordinate properties of an underlying B.
AB	A horizon transitional between A and B, having an upper part dominated by properties of A and a lower part dominated by properties of B; the two parts cannot be conveniently separated into A3 and B1.
A & B	Horizons that would qualify for A2 except for included parts constituting less than 50 percent of the volume that would qualify as B.
AC	A horizon transitional between A and C, having subordinate properties of both A and C but not dominated by properties characteristic of either A or C.
B & A	Any horizon qualifying as B in more than 50 percent of its volume, including parts that qualify as A2.
B	Horizons in which the dominant feature or features is one or more of the following: (i) an illuvial concentration of silicate clay, iron, aluminum, or humus, alone or in combination; (ii) a residual concentration of sesquioxides or silicate clays, alone or mixed, that has formed by means other than solution and removal of carbonates or more soluble salts; (iii) coatings of sesquioxides adequate to give conspiciously darker, stronger, or redder colors than overlying and underlying horizons in the same sequum but without apparent illuviation of iron and not genetically related to B horizons that meet requirements of (i) or (ii) in the same sequum; or (iv) an alteration of material from its original condition in sequums lacking conditions defined in (i), (ii), and (iii) that obliterates original rock structure, that forms silicate clays, liberates oxides, or both, and that forms granular, blocky, or prismatic structure if textures are such that volume changes accompany changes in moisture.
B1	A transitional horizon between B and A1 or between B and A2 in which the horizon is dominated by properties of an underlying B2 but has some subordinate properties of an overlying A1 or A2.
B2	That part of the B horizon where the properties on which the B is based are without clearly expressed subordinate characteristics, indicating that the horizon is transitional to an adjacent overlying A or an adjacent underlying C or R.
B3	A transitional horizon between B and C or R in which the properties diagnostic of an overlying B2 are clearly expressed but are associated with clearly expressed properties characteristic of C or R.
C	A mineral horizon or layer, excluding bedrock, that is either like or unlike the material from which the solum is presumed to have formed, relatively little affected by pedogenic processes, and lacking properties diagnostic of A or B but including materials modified by (i) weathering outside the zone of major biological activity; (ii) reversible cementation, development of brittleness, development of high bulk density, and toher properties characteristic of fragipans; (iii) gleying; (iv) accumulation of calcium or magnesium carbonate or more soluble salts; (v) cementation by accumulations, such as calcium or magnesium carbonate or more soluble salts; or (vi) cementation by alkali-soluble siliceous material or by iron and silica.
R	Underlying consolidated bedrock, such as granite, sandstone, or limestone. If presumed to be like the parent rock from which the adjacent overlying layer or horizon was formed, the symbol R is used alone. If presumed to be unlike the overlying material, the R is preceded by a Roman numeral denoting lithologic discontinuity.

other soil mapping units in relation to the prominent physical and cultural features of the earth's surface. The following kinds of soil maps are recognized in the United States: detailed, detailed reconnaissance, reconnaissance, generalized, and schematic.

soil mapping unit – A kind of soil, a combination of kinds of soil, or miscellaneous land type or types, that can be shown at the scale of mapping for the defined purposes and objectives of the survey. (Combination of kinds of soil includes soil association, complexes, undifferentiated soils, or any class or combination of classes at the family level or higher categories of the soil classification system.) Soil mapping units are the basis for the delineations of a soil survey map. A soil survey identification legend lists all mapping units for the survey of an area (any size area from a small plot to a county, a nation, or the world). Mapping units normally contain inclusions of soils outside the limits of the taxonomic name, or names, used as the name for the mapping unit. Mapping units are generally designed to reflect significant defferences in use and management.

soil mineralogy classes for family groupings (As used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – The family category includes mineralogy classes for specific control sections which are similar to those used for particle size classes for family groupings. For example, the term micaceous denotes that more than 40 percent by weight of the 0.02– to 20–millimeter fraction of the soil material within the control section is mica. Examples of some mineralogy classes are listed below:

- **ferritic** – For soils of any texture, the whole soil less than 2 millimeters in the control section contains more than 40 percent (weight) iron oxide as (Fe_2O_3) extractable by citrate-dithionite.
- **illitic** – In clayey soils, more than half by weight of the clay-size fraction is composed of illite (hydrous mica) commonly with greater than 3 percent K_2O.
- **kaolinitic** – In clayey soils, more than half by weight of the clay-size fraction is composed of kaolinite, dickite and nacrite with smaller amounts of other 1:1 or nonexpanding 2:1 layer minerals or gibbsite.
- **micaceous** – See soil mineralogy classes.
- **mixed** – Soils that have a combination of minerals in which no single class of mineralogy is dominant.
- **montmorillonitic** – In clayey soils, more than half by weight of the clay-size fraction is composed of montmorillonite and nontronite, or a mixture with more montmorillonite than any other single clay mineral.
- **siliceous** – In the 0.02- to 2-millimeter fraction within the control section of sandy, silty, and loamy soils more than 90 percent by weight of silica minerals (quartz, 50 percent of the volume that would qualify as B. 7 or more in the Mohs scale.

soil moisture tension – The force per unit area that must be exerted to remove water from soil.

soil monolith – A vertical section of a soil profile removed and mounted for display or study.

soil morphology – The constitution of the soil, including the texture; structure; consistence; color; and other physical, chemical, and biological properties of the various soil horizons that make up the soil profile.

soil organic matter – The organic fraction of the soil that includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population. Commonly determined as the amount of organic material contained in a soil sample passed through a 2-millimeter sieve.

soil piping – See piping.

soil pores – See pore space.

soil porosity – See porosity, soil.

soil probe – A tool having a hollow cylinder with a cutting edge at the lower end, used for probing into the soil and withdrawing a small sample for field or laboratory observation.

soil productivity – The capacity of a soil in its normal environment for producing a specified plant or sequence of plants under a specified system of management.

soil profile – A vertical section of the soil from the surface through all its horizons, including C horizons. See soil horizons.

soil separates – Mineral particles, less than 2.0 millimeters in equivalent diameter, ranging between specified size limits. The names and size limits of separates recognized by the National Cooperative Soil Survey in the United States are very coarse sand, 2.0 to 1.0 millimeters (called fine gravel prior to 1947, now fine gravel includes particles between 2.0 millimeters and about 12.5 millimeters in diameter); coarse sand, 1.0 to 0.5 millimeter; medium sand, 0.5 to 0.25 millimeter; fine sand, 0.25 to 0.10 millimeter; very fine sand, 0.10 to 0.05 millimeter; silt, 0.05 to 0.002 millimeter; and clay, less than 0.002 millimeter (Before 1937, clay included particles less than 0.005 millimeter in diameter and silt, those particles from 0.05 to 0.005 millimeter). The separates recognized by the International Society of Soil Science are coarse sand, 2.0 to 0.2 millimeters; fine sand, 0.2 to 0.02 millimeter; silt, 0.02 to 0.002 millimeter; and clay, less than 0.002 millimeter.

soil series – See soil classification.

soil structure – The combination or arrangement of primary soil particles into secondary particles, units, or peds (Table 4). The secondary units are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types, and grades, respectively. See soil structure classes; soil structure grades; soil structure types.

soil structure classes – A grouping of soil structural units or peds on the basis of size (Table 4). See soil structure; soil structure types.

soil structure grades – A grouping or classification of soil structure on the basis of inter- and intra-aggregate adhesion, cohesion, or stability within the profile. Four grades used are structureless, weak, moderate, and strong, depending on observable degree of aggregation.

soil structure types – A classification of soil structure based on the shape of the aggregates or peds and their arrangement in the profile (Table 4). Generally the shape of soil structure types is referred to as either platy, prismatic, columnar, blocky, granular, or crumb. See soil structure; soil structure classes; soil structure grades.

soil survey – A general term for the systematic examination of soils in the field and in laboratories; their description and classification; the mapping of kinds of soil; the interpretation of soils according to their adaptability for various crops, grasses, and trees; their behavior under use or treatment for plant production or for other purposes; and their productivity under different management systems.

soil taxonomic unit – A unit of all soils that fall within the defined limits of a class at any categoric level in a system of soil classification. Commonly used as a member of the lowest class in the present classification scheme and in that use is equivalent to a series.

soil temperature classes for family groupings (as used in the Soil Classification System of the National Cooperative Soil Survey in the United States) – Classes are based on mean annual soil temperature and difference between mean summer and mean winter temperature. Soil temperature is determined at a depth of 50 centimeters (20 inches) or at a lithic or paralithic contact, whichever is shallower. Unless used in a higher category, soil temperature classes are used at the family level as follows: (1) Soils with 5°C (9°F) or more difference between mean summer (June, July, and August) and mean winter (December, January, and February) temperatures, and with mean annual soil temperatures as follows: less than 8°C (47°F), frigid; 8°C to 15°C (47°F to 59°F), mesic; 15°C to 22°C (59°F to 72°F), thermic; and more than 22°C (72°F), hyperthermic. (2) Soils with less than 5°C (9°F) difference between mean summer and winter soil temperatures, and with mean annual soil temperatures as follows: less than 8°C (47°F), isofrigid; 8°C to 15°C (47°F to 59°F), isomesic; 15°C to 22°C (59°F to 72°F), isothermic; and 22°C (72°F) or

Table 4. Types and classes of soil structure.

Class	Type (shape and arrangement of peds)						
	Platelike with one dimension (the vertical) limited and greatly less than the other two; arranged around a horizontal plane; faces mostly horizontal	Prismlike with two dimensions (the horizontal) limited and considerably less than the vertical; arranged around a vertical line; vertical faces well defined; vertices angular		Blocklike, polyhedron like, or spheroidal, with three dimensions of the same order of magnitude, arranged around a point.			
				Blocklike; blocks or polyhedrons having plane or curved surfaces that are casts of the molds formed by the faces of the surrounding peds		Spheroids of polyhedrons having plane or curved surfaces which have slight or no accommodation to faces of surrounding peds	
		Without rounded caps	With rounded caps	Faces flattened; most vertices sharply angular	Mixed rounded and flattened faces with many rounded vertices	Relatively nonporous peds	Porous peds
	Platy	Prismatic	Columnar	(Angular) Blocky[1]	Subangular Blocky[2]	Granular	Crumb
Very fine or very thin	Very thin platy; <1 mm	Very fine prismatic; <10 mm	Very fine columnar; <10 mm	Very fine angular blocky; <5 mm	Very fine subangular blocky; <5 mm	Very fine granular; <1 mm	Very fine crumb; <1 mm
Fine or thin	Thin platy; 1-2 mm	Fine prismatic; 10-20 mm	Fine columnar; 5-10 mm	Fine angular blocky; 5-10 mm	Fine subangular blocky; 5-10 mm	Fine granular; 1-2mm	Fine crumb; 1-2 mm
Medium	Medium platy; 2-5 mm	Medium prismatic; 20-50 mm	Medium columnar; 20-50 mm	Medium angular blocky; 10-20 mm	Medium subangular blocky; 10-20 mm	Medium granular; 2-5 mm	Medium crumb; 2-5 mm
Coarse ot thick	Thick platy; 5-10 mm	Coarse prismatic; 50-100 MM	Coarse columnar; 50-100 mm	Coarse angular blocky; 20-50 mm	Coarse subangular blocky, 20-50 mm	Coarse granular; 5-10 mm	
Very coarse or very thick	Very thick platy; >10 mm	Very coarse prismatic; >100 mm	Very coarse columnar; >100 mm	Very coarse angular blocky; >50 mm	Very coarse subangular blocky; >50 mm	Very coarse granular; >10 mm	

Source: Soil Survey Staff, Soil Conservation Service, U.S. Department of Agriculture, 1951. *Soil Survey manual.* Agricultural Handbook 18. U. S. Government Printing Office, Washington, D.C. p. 228.

[1] (a) Sometimes called nut. (b) The word "angular" in the name ordinarilycan be omitted.

[2] Sometimes called nuciform, nut, or subangular nut. Since the size connotation of these terms is a source of great confusion to many, they are not recommended.

higher, isohyperthermic.

soil texture – The relative proportions of the various soil separates in a soil as described by the classes of soil texture shown in figure 1. The textural classes may be modified by the addition of suitable adjectives when coarse fragments are present in substantial amounts, for example, gravelly silt loam. (For other modifications see coarse fragments.) Sand, loamy sand, and sandy loam are further subdivided on the basis of the proportions of the various sand separates present. The limits of the various classes and subclasses are as follows:

sand – Soil material that contains 85 percent or more of sand. The percentage of silt plus 1.5 times the percentage of clay shall not exceed 15.

coarse sand – 25 percent or more very coarse and coarse sand and less than 50 percent any other one grade of sand.

sand – 25 percent or more very coarse, coarse, and medium sand and less than 50 percent fine or very fine sand.

fine sand – 50 percent or more find sand, or less than 25 percent very coarse, more fine sand, or less than 25 percent very coarse, fine sand.

very fine sand – 50 percent or more very fine sand.

loamy sand – Soil material that contains, at the upper limit, 85 to 90 percent sand, and the percentage of silt plus 1.5 times the percentage of clay is not less than 15. At the lower limit, it contains not less than 70 to 85 percent sand, and the percentage of silt plus twice the percentage of clay does not exceed 30.

loamy coarse sand – 25 percent or more very coarse and coarse sand and less than 50 percent any other one grade of sand.

loamy sand – 25 percent or more very coarse, coarse, and medium sand and less than 50 percent fine or very fine sand.

loamy fine sand – 50 percent or more fine sand, or less than 25 percent very coarse, coarse, and medium sand and 50 percent very fine sand.

loamy very fine sand – 50 percent or more very fine sand.

sandy loam – Soil material that contains either 20 percent or less clay, and the percentage of silt plus twice the percentage of clay exceeds 30, and 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 and 52 percent sand.

coarse sandy loam – 25 percent or more very coarse and coarse sand and less than 50 percent any other one grade of sand.

sandy loam – 30 percent or more very coarse, coarse, and medium sand but less than 25 percent very coarse sand and less than 30 percent very fine or fine sand.

fine sandy loam – 30 percent or more fine sand and less than 30 percent very fine sand, or between 15 and 30 percent very coarse, coarse, and medium sand.

very fine sandy loam – 30 percent or more very fine sand, or more than 40 percent fine and very fine sand, at least half of which is very fine sand and less than 15 percent very coarse, coarse, and medium sand.

loam – Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

silt loam – Soil material that contains 50 percent or more silt and 12 to 27 percent clay, or 50 to 80 percent silt and less than 12 percent clay.

silt – Soil material that contains 80 percent or more silt and less than 12 percent clay.

sandy clay loam – Soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more sand.

clay loam – Soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

silty clay loam – Soil material that contains 27 to 40 percent clay and less than 20 percent sand.

sandy clay – Soil material that contains 35 percent or more clay and 45 percent or more sand.

silty clay – Soil material that contains 40 percent or more clay and 40 percent or more silt.

clay – Soil material that contains 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

soil type – 1: A subdivision of a soil series based on surface texture. At the present time in the United States a soil type is considered as a kind of phase and is not part of the soil classification system presently being used. See phase, soil. 2: In Europe, a class roughly equivalent to a great soil group.

soil variant – A kind of soil whose properties are believed to be sufficiently different from recognized series to justify a new series name but comprising such a limited geographic area that creation of a new series is not justified.

Sol Brun Acide – A zonal group of soils developed under forest vegetation with thin A1 horizon, a paler A2 horizon which is poorly differentiated from the B2 horizon, a B2 horizon with uniform color from top to bottom, weak subangular blocky structure, and lacking evidence of silicate clay accumulation. The sola are strongly to very strongly acid and have low base status.

solifluction – The slow downhill flowage or creep of soil and

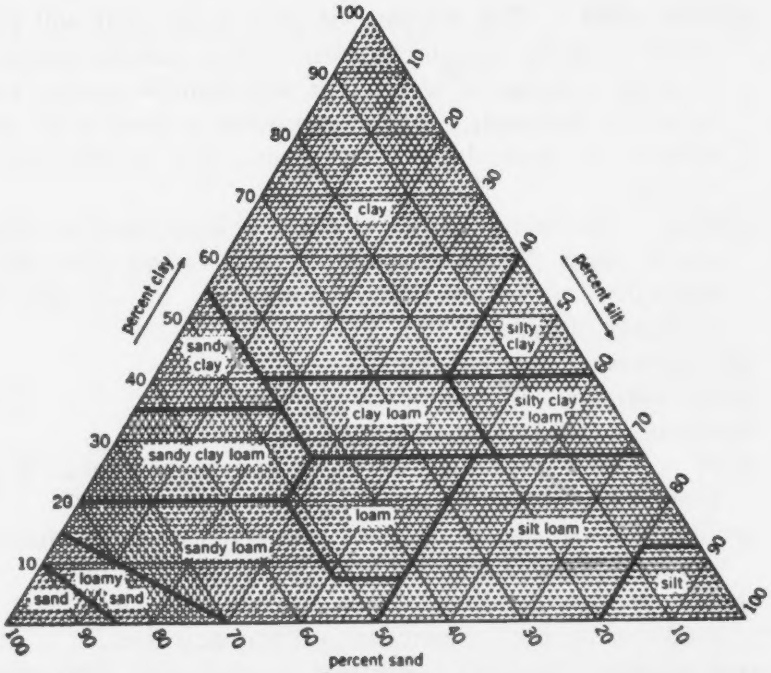

Figure 1. Three-coordinate graph showing the percentages of sand, silt, and clay in the soil textural classes. From the USDA *Soil Survey Manual.*

other loose materials that become saturated.

Solonchak – A great soil group of the intrazonal order and halomorphic suborder, consisting of soils with a gray, thin, salty crust on the surface, with fine granular mulch immediately below, underlain with grayish, friable, salty soil; formed under subhumid to arid, hot or cool climates, under conditions of poor drainage, and under a sparse growth of halophytic grasses, shrubs, and some trees.

Solonetz – A great soil group of the intrazonal order and halomorphic suborder, consisting of soils with a very thin, friable, surface soil underlain by a dark, hard, columnar layer, usually highly alkaline; formed under subhumid to arid, hot to cool climates, under better drainage than Solonchaks, and under a native vegetation of halophytic plants.

solum (pl. sola) – The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils includes the A and B horizons. Usually the characteristics of the material in these horizons are quite unlike those of the underlying parent material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

sorting – The separation and segregation of rock fragments according to size of particles, specific gravity, and different shapes by natural processes, mainly the action of running water or wind. "Well sorted" refers to representation of one grade size; "poorly sorted" refers to representation of many grade sizes in a sample of material.

specific energy – The energy of a stream referred to its bed, namely, depth plus velocity head of mean velocity.

specific gravity – The relative weight of a given volume of any kind of matter (volume occupied by solid phase, pore space excluded) compared with an equal volume of distilled water at a specified temperature. The average specific gravity for soil is about 2.65. Contrast with bulk density.

specific retention – That volume of water that is retained by adhesion against the pull of gravity, expressed in percent of the total volume of water-bearing materials.

specific yield – The fraction of pore space that will yield water to wells, equaling porosity minus specific retention. It is the amount of water that will drain by gravity from saturated materials, usually expressed in percent of total volume of water-bearing materials. The coefficient of storage.

spillway – An open or closed channel, or both, used to convey excess water from a reservoir. It may contain gates, either manually or automatically controlled, to regulate the discharge of excess water.

splash erosion – See erosion.

spodic horizon – See diagnostic horizons.

Spodosols – See soil classification.

spoil – Soil or rock material excavated from a canal, ditch, basin, or similar construction.

spoilbank – A pile of soil, subsoil, rock, or other material excavated from a drainage ditch, pond, or other cut.

sports site – Land or water substantially developed or modified for use for concentrated play activities.

spot planting (forestry) – Planting in small open areas among established groups or stands of trees. See interplanting.

spreader (hydraulics) – A device for distributing water uniformly in or from a channel.

spreader strip – A relatively permanent contour strip of variable width planted to a sod or erosion resistant crop, used to slow down and fan out the runoff from land above the strip.

sprigging – The planting of a portion of the stem and root of grass.

sprinkler irrigation – Irrigation where water is applied by means of perforated pipes or nozzles operated under pressure so as to form a spray pattern.

sprinkler pattern – The areal distribution of water applied either by perforated pipe, single sprinkler nozzle, or by the entire sprinkler lateral or laterals.

sprinkler systems – All sprinkler lines, main lines, submains, pumping plant, operation control equipment, and other accessories required for applying water to a field by the sprinkler method.

stabilized grade – The slope of a channel at which neither erosion nor deposition occurs.

staff gage – Graduated scale mounted on a plank, pier, wall, or other like object from which the water surface elevation may be read.

stage (hydraulics) – The variable water surface or the water surface elevation above any chosen datum. See gage height; gaging station.

stand – 1: An aggregation of trees or other growth occupying a specific area and sufficiently uniform in composition (species), age arrangement, and condition to be distinguishable from the forest or other growth on adjoining areas. 2: The number of plants per unit of area other than trees.

standard deviation (statistics) – A measure of the average variation of a series of observations or items of a population about their mean. In normally distributed sets of moderate size, the interval of the mean, plus or minus the standard deviation, includes about 2/3 of the items.

standard error of estimate (statistics) – An estimate of the standard deviation of means of samples drawn from a single population, often calculated from a single set of samples.

standard of living – Standards of living constitute an organic whole, touching every phase of the life of the individual, the family, or the group. They concern the kind and quantity of food consumed, the sort of house lived in, clothing worn, etc., as well as the various cultural elements of existence, such as education, recreation, participation in church and civic organizations, and numerous other activities.

state soil conservation committee, commission, or board – The state agency established by state soil conservation district enabling legislation to assist with the administration of the provisions of the state soil conservation districts law. The official title may vary from the above as new or amended state laws are made.

static head – Head resulting from elevation differences, for example, the difference in elevation of headwater and tailwater of a power plant.

static lift – Vertical distance between source and discharge water levels in a pump installation.

steady flow – Flow in which the rate remains constant with time at a given cross-section.

stilling basin – An open structure or excavation at the foot of an overfall, chute, drop, or spillway to reduce the energy of the descending stream.

stocking – The degree to which an area is effectively covered with living trees. Fully stocked stands contain as many trees per acre as can properly use the growing space available.

stocking rate – The actual number of animals using a grazing unit, for example, fish per acre, water fowl per acre, etc.

stockwater development – Development of new or improved sources of stockwater supplies, such as wells, springs, and ponds, together with storage and delivery systems.

stolon – A horizontal stem which grows along the surface of the soil and roots at the nodes.

stone line – A concentration of coarse fragments in soils. In cross-section, the line may be marked only by scattered fragments or it may be a discrete layer of fragments. The fragments are more often pebbles or cobbles than stones. The line generally overlies material that was subjected to weathering, soil formation, and erosion before deposition of the overlying material.

stones – See coarse fragments.

stoniness – The relative proportion of stones in or on the soil, used in classifying soils. See coarse fragments; stony; very stony; stony land.

stony – Containing sufficient stones to interfere with tillage but not to make intertilled crops impracticable. Stones may occupy 0.01 to 0.1 percent of the surface. Stoniness is not a part of the soil textural class. The terms "stony" and "very stony" may modify the soil textural class name in the soil type, but this is simply a brief way of designating stony phases.

stony land – Areas containing sufficient stones to make the use of machinery impractical, usually 15 to 90 percent of the surface is covered with stones. A miscellaneous land type. See stoniness; rubble land.

storage capacity – See available water-holding capacity.

storage curve (hydraulics) – A graphical expression of stage or elevation versus the accumulated storage or volume at this stage or elevation.

storm – In general, a disturbance of the atmosphere. The term may be qualified to emphasize a particular part of the meteorological distrubance, such as windstorm, sandstorm, rainstorm, or thunderstorm.

stover – The dried, cured stems and leaves of tall, coarse grain crops, such as corn and sorghum, after the grain has been removed. Contrast with fodder and hay.

stratigraphy – The branch of geology that deals with the definition and interpretation of stratified rocks; the conditions of their formation; their character, arrangment, sequence, age, and distribution; and especially their correlation by the use of fossils and other means. The term is applied both to the sum of the characteristics listed and a study of these characteristics.

streambanks – The usual boundaries, not the flood boundaries, of a stream channel. Right and left banks are named facing downstream.

stream gaging – The quantitative determination of stream flow using gages, current meters, weirs, or other measuring instruments at selected locations. See gaging station.

stream load – Quantity of solid and dissolved material carried by a stream. See sediment load.

stripcropping – Growing crops in a systematic arrangement of strips or bands which serve as barriers to wind and water erosion. See buffer strips; contour strip cropping; correction strip; field strip-cropping; filter strip; sod strips; spreader strip; strip sodding; contour; wind stripcropping.

strip grazing – A system whereby animals are confined to a small area of pasture for a short period of time, usually 1 to 2 days.

stubble – The basal portion of plants remaining after the top portion has been harvested; also, the portion of the plants, principally grasses, remaining after grazing is completed.

stubble crops – 1: Crops that develop from the stubble of the previous season. 2: Crops sowed on grain stubble after harvest for turning under the following spring.

stubble mulch – The stubble of crops or crop residues left essentially in place on the land as a surface cover during fallow and the growing of a succeeding crop.

stumpage – The value of uncut timber; the standing timber.

stylolites – Thin seams, more or less planar in gross plan but intricately irregular in detail, abundantly developed in limestones, dolomites, and marble. Columns and pits on one side fit into their counterparts on the other so that the trace in cross section is a complicated series of zigzags of microscopic to several inches amplitude.

subcritical flow – Flow at velocities less than critical.

subgrade – The soil prepared and compacted to support a structure or a pavement system.

subgrade modulus (engineering) – The resistance of soil material to unit area displacement under load, expressed in pounds per square inch. For example, if a load of 1,000 pounds on 100 square inches of surface penetrates 1 inch, the modulus is 10.

subgroup – See soil classification.

subhumid – A term applied to regions or climates where moisture is normally less than under humid conditions but still sufficient for the production of many agricultural crops without irrigation or dryland farming. Natural vegetation is mostly tall grasses. Annual rainfall varies from 20 inches in cool regions to as much as 60 inches in hot areas. Contrast with humid.

subirrigation – Applying irrigation water below the ground surface either by raising the water table within or near the root zone, or by using a buried perforated or porous pipe system that discharges directly into the root zone.

submerged discharge – Discharge from an outlet or measuring device below or partially below a free-water surface.

submerged weir – A weir which, in use, has the tailwater level higher than the weir crest. Contrast with free weir.

suborder – See soil classification.

subsidence – A downward movement of the ground surface caused by solution and collapse of underlying soluble deposits, rearrangement of particles upon removal of coal, or reduction of fluid pressures within an aquifer or petroleum reservoir.

subsistence farm – A low-income farm where the emphasis is on production for use by the operator and his family.

subsoil – The B horizons of soils with distinct profiles. In soils with weak profile development, the subsoil can be defined as the soil below the plowed soil (or its equivalent of surface soil), in which roots normally grow. Although a common term, it cannot be defined accurately. It has been carried over from early days when "soil" was conceived only as the plowed soil and that under it as the "subsoil."

subsoiling – The tillage of subsurface soil, without inversion, for the purpose of breaking up dense layers that restrict water movement and root penetration.

substratum – Any layer lying beneath the soil solum, either conforming (C or R) or unconforming.

subsurface irrigation – See subirrigation.

subsurface tillage – Tillage with specialized equipment which loosens and prepares a seedbed but does not invert the surface residual mulch. See mulch tillage.

subwatershed – A watershed subdivision of unspecified size that forms a convenient natural unit. See watershed.

succession – The progressive development of vegetation toward its highest ecological expression, the climax; replacement of one plant community by another.

summer fallow – The tillage of uncropped land during the summer in order to control weeds and store moisture in the soil for the growth of a later crop.

sump – Pit, tank, or reservoir in which water is collected for withdrawal or stored.

supplemental feeding – Supplying concentrates or harvested feed to correct deficiencies of the range diet. Often erroneously used to mean emergency feeding.

supplemental irrigation – Irrigation to insure or increase crop production in areas where rainfall normally supplies most of the moisture needed.

supplemental pasture – Additional pasture for use in adverse weather, usually annual forage crops for dry periods or winter. See temporary pasture.

suppressed weir – A measuring weir with the sides of the notch flush with the walls of the channel. Also known as a full-width weir.

surface irrigation – Irrigation where the soil surface is used as a conduit, as in furrow and border irrigation as opposed to sprinkler irrigation or subirrigation.

surface profile (hydraulics) – The longitudinal profile assumed by the surface of a stream flowing in an open channel; the hydraulic grade line.

surface soil – The uppermost part of the soil ordinarily moved in tillage or its equivalent in uncultivated soils, ranging in depth from about 5 to 8 inches. Frequently designated as the plow layer, the Ap layer, or the Ap horizon.

surface storage – Sum of detention and channel storage, representing, at any given moment, the total water en route to an outlet from an area or watershed.

suspended load – Solids or sediments suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

swamp – An area saturated with water throughout much of the year but with the surface of the soil usually not deeply submerged, usually characterized by tree or shrub vegetation. See marsh; miscellaneous land type.

swash marks – The wavy lines of fine sand or bits of debris left on the beach at the upward limit of the rush of water following the breaking of a wave.

synecology – A subdivision of ecology that deals with the study of groups of organisms associated as a unit.

tailwater (hydraulics) – Water, in a river or channel, immediately downstream from a structure. (Irrigation) – Water that reaches the lower end of a field.

talus – Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

tank, earth – A structure for impounding water, formed by an excavation and an earthen dam across a drainage.

taproot system – A plant root system dominated by a single large "taproot," normally growing straight down, from which most or all of the smaller roots spread out laterally. Contrast with fibrous root system.

taxadjunct – Soils that are unclassified at the series level but allowed to go under the name of a defined series. They are so like the soils of the defined series in morphology, composition, and behavior that little or nothing is gained by adding a new series.

taxonomic unit – See soil taxonomic unit.

temporary pasture – A pasture designed to provide grazing for only a short period, usually consisting of annual plants. See supplemental pasture.

tensiometer – Instrument used for measuring the suction or negative pressure of soil water.

terrace – An embankment or combination of an embankment and channel constructed across a slope to control erosion by diverting or storing surface runoff instead of permitting it to flow uninterrupted down the slope. Terraces or terrace systems may be classified by their alignment, gradient, outlet, and cross-section. Alignment is parallel or non-parallel. Gradient may be level, uniformly graded, or variably graded. Grade is often incorporated to permit paralleling the terraces. Outlets may be soil infiltration only, vegetated waterways, tile outlets, or combinations of these. Cross-sections may be narrow base, broad base, bench, steep backslope, flat channel, or channel.

terrace interval – Distance measured either vertically or horizontally between corresponding points on two adjacent terraces.

terrace outlet channel – Channel, usually having a vegetative cover, into which the flow from one or more terraces is discharged and conveyed from the field.

terrace system – A series of terraces occupying a slope and discharging runoff into one or more outlet channels.

territory (wildlife) – The defended part of an animal's range.

textural classification – See soil texture.

texture – See soil texture.

thalweg – A line following the lowest part of a valley whether under water or not.

thermic – See soil temperature classes for family groupings.

thinning (forestry) – A cutting made in immature stands to provide more growing space and increase the growth rate of remaining trees.

threshold velocity – The minimum velocity at which wind will begin moving particles of sand or other soil material.

tide gate – A swinging gate on the outside of a drainage conduit from a diked field that excludes water at high tide and permits drainage at low tide.

tight soil – A compact, relatively impervious and tenacious soil, or subsoil, which may or may not be plastic.

tile, drain – Pipe made of burned clay, concrete, or similar material, in short lengths, usually laid with open joints to collect and carry excess water from the soil.

tile drainage – Land drainage by means of a series of tile lines laid at a specified depth and grade.

till – 1: Unstratified glacial drift deposited directly by the ice and consisting of clay, sand, gravel, and boulders intermingled in any proportion. 2: To plow and prepare for seeding; to seed or cultivate the soil.

tillage – The operation of implements through the soil to prepare seedbeds and root beds.

tillage pan – See pan, pressure or induced.

tiller – An erect or semi-erect branch arising from a bud in the axils of leaves at the base of a plant. Wheat and other annual and perennial grasses increase in circumference by tillers.

tilth – The physical condition of soil as related to its ease of tillage, fitness as a seedbed, and impedance to seedling emergence and root penetration.

tilting gate (hydraulics) – A hinged gate, counterbalanced by weights, that automatically opens or closes with a change in head.

time of concentration – Time required for water to flow from the most remote point of a watershed, in a hydraulic sense, to the outlet.

toe (engineering) – Terminal edge or edges of a structure.

toe drain – Interceptor drain located near the downstream toe of a structure.

toe wall – Downstream wall of a structure.

topsoil – 1: Earthy material used as top-dressing for house lots, grounds for large buildings, gardens, road cuts, or similar areas. It has favorable characteristics for production of desired kinds of vegetation or can be made favorable. 2: The surface plow layer of a soil. Syn. surface soil. 3: The original or present dark-colored upper soil that ranges from a mere fraction of an inch to two or three feet thick on different kinds of soil. 4: The original or present A horizon, varying widely among different kinds of soil. Applied to soils in the field, the term has no precise meaning unless defined as to depth or productivity in relation to a specific kind of soil.

total digestible nutrients – A standard evaluation of the digestibility of a particular livestock feed, including all the digestible organic nutrients: protein, fiber, nitrogen-free extract, and fat. (The latter is multiplied by 2.25 because its energy value for animals is approximately 2.25 times that of protein or carbohydrates.) The percentage of total digestible nutrients represents the approximate heat or energy value of the feed. Abbr. TDN.

toxic salt reduction – Decreasing harmful contrations of toxic salts in soils, usually by leaching and with or without the addition of soil amendments.

trace elements – See micronutrients.

transmission loss – See conveyance loss.

transmissibility – The rate or flow of groundwater, at the prevailing temperature, through a vertical strip of aquifer one foot wide with a height equal to the saturated thickness of the aquifer and under a unit hydraulic gradient.

transpiration – The process by which water vapor is released to the atmosphere by the foliage or other parts of a living plant.

transplant (forestry) – A seedling that has been transplanted one or more times in the nursery.

transportation – The movement of detached soil material across the land surface or through the air. May be accomplished by running water, wind, or gravity. Soil erosion. See detachment.

trap – See sand trap.

trap efficiency – The capability of a reservoir to trap sediment.

trapezoidal measuring flume – See Venturi flume.

trash rack – See debris guard.

tree – A woody perennial plant that reaches a mature height of at least 8 feet and has a well-defined stem and a definite crown shape. There is no clear-cut distinction between trees and shrubs. Some plants, such as the willows, may grow as either trees or shrubs.

tributary – Secondary or branch of a stream, drain, or other channel that contributes flow to the primary or main channel.

trophic – Relating to the processes of energy and nutrient transfer from one or more organisms to others in an ecosystem.

truncated soil profile – Soil profile that has been cut down by accelerated erosion or by mechanical means. The profile may have lost part or all of the A horizon and sometimes the B horizon, leaving only the C horizon. Comparison of an eroded soil profile with a virgin profile of the same area, soil type, and slope conditions, indicates the degree of truncation.

tundra – The treeless land in arctic and alpine regions, varying from bare area to various types of vegetation consisting of grasses, sedges, forbs, dwarf shrubs, mosses, and lichens.

tundra soils – 1: Soils characteristic of tundra regions. 2: A zonal great soil group consisting of soils with dark-brown peaty layers over grayish horizons mottled with rust and having continually frozen substrata, formed under frigid, humid climates with poor drainage. Native vegetation consists of lichens, moss, flowering plants, and shrubs.

turbulent flow (hydraulics) – A type of flow in which any particle may move in any direction with respect to any other particle and not in a fixed or regular path. The water is agitated by cross currents and eddies.

turbulent velocity (hydraulics) – That velocity above which turbulent flow will always exist in a particular conduit and below which the flow may either be turbulent or laminar, depending on circumstances.

turnout – See delivery box.

Ultisols – see soil classification.

umbric epipedon – See diagnostic horizons.

unavailable forage – Forage not available to grazing animals.

undergrazing – An intensity of grazing in which the forage available for consumption under a system of conservation pasture management is not used to best advantage. Contrast with overgrazing.

undergrowth (forestry) – Seedlings, shoots, and small saplings under an existing stand of trees.

underlying stratum – See substratum.

underplant – To plant young trees or sow seeds under an existing stand of trees.

understory – That portion of the trees in a forest below the upper crown cover. Syn. underwood. Contrast with overstory.

underuse – Degrees of grazing use that are less than the degree deemed essential for proper grazing use.

undifferentiated soil group (mapping unit) – Two or more soils or land types that are mapped as one unit because their differences are not significant to the purpose of the survey or to soil management.

unhulled seed – Any seed normally covered by a hull, that is, by bracts or other coating, and from which the hull has not been removed.

Unified Soil Classification System (engineering) – A classification system based on the identification of soils according to their particle size, gradation, plasticity index, and liquid limit.

uniform flow – A state of steady flow when the mean velocity and cross-sectional area are equal at all sections of a reach.

universal soil loss equation – An equation used for the design of water erosion control systems: $A = RKLSPC$ wherein A = average annual soil loss in tons per acre per year; R = rainfall factor; K = soil erodibility factor; L = length of slope; S = percent of slope; P = conservation practice factor; and C = cropping and management factor. (T = soil loss tolerance value that has been assigned each soil, expressed T/A/Year).

unsaturated flow – Movement of water in a soil, the pores of which contain both air and water.

uplift (hydraulics) – The upward pressure of water on the base of a structure.

urban land – Areas so altered or obstructed by urban works or structures that identification of soils is not feasible. A miscellaneous land type.

utility – The ability of a good to satisfy human wants.

vacation farm – A rural area operated as a working or simulated farm with vacation living accommodations for rent.

valence – That property of an element that is measured in terms of the number of gram atoms of hydrogen that one gram atom of that element will combine with or displace; for example, the valence of oxygen in water, H_2O, is 2.

valley cross section – The vertical and horizontal configuration of a valley normal to the direction of water runoff.

value, color – The relative lightness or intensity of color, approximately a function of the square root of the total amount of light. One of the three variables of color. See Munsell color system; hue; chroma.

variable costs – Costs subject to the year's production schedule. As such, they may be largely controlled by the operator. Examples are the use of fertilizer and insecticides, hauling grain, etc.

vegetated channel – See grassed waterway.

vegetation – Plants in general or the sum total of plant life in an area.

vegetation type – A plant community with distinguishable characteristics.

velocity head (hydraulics) – Head due to the velocity of a moving fluid, equal to the square of the mean velocity divided by twice the acceleration due to gravity.

Venturi flume – Calibrated measuring flume having a contracted throat section which produces a differential head that can be related to discharge.

Venturi meter – A proprietary device for measuring the flow of fluids through pipes, consisting essentially of a Venturi tube and a special form of flow-registering device.

Venturi tube – A closed conduit that gradually contracts to a throat, causing a reduction of pressure head by which the velocity through the throat may be determined.

Vertisols – See soil classification.

very coarse sand – See soil separates; soil texture.

very fine – See particle-size classes for family groupings.

very fine sand – See soil separates; soil texture.

very fine sandy loam – See soil separates; soil texture.

very stony – Containing sufficient stones to make tillage of intertilled crops impracticable. The soil can be worked for hay crops or improved pasture if other soil characteristics are favorable. Stones occupy approximately 0.1 to 3 percent of the surface. See stony for discussion of phase names.

virgin forest – A mature or overmature forest essentially uninfluenced by human activity.

voids – A general term for pore spaces or other openings in rock. In addition to pore space, the term includes vesicles, solution cavities, or any openings, either primary or secondary. Syn. interstices.

volume weight – See bulk density.

warm-season plant – A plant that completes most of its growth during the warm portion of the year, generally late spring and summer.

wasteway – Channel for conveying or discharging excess or waste water.

water application efficiency – Ratio of the volume of water stored in the root zone of a soil during irrigation to the volume of water applied.

water classification – Separation of water of an area into classes according to usage, such as domestic consumption, fisheries, recreation, industrial, agricultural, navigation, waste disposal, etc.

water conservation – The physical control, protection, management, and use of water resources in such a way as to maintain crop, grazing, and forest lands; vegetal cover; wildlife; and wildlife habitat for maximum sustained benefits to people, agriculture, industry, commerce, and other segments of the national economy.

water control (soil and water conservation) – The physical control of water by such measures as conservation practices on the land, channel improvements, and installation of structures for water retardation and sediment detention (does not refer to legal control or water rights as defined).

water cushion – Pool of water maintained to absorb the impact of water flowing from an overfall structure.

water demand – Water requirements for a particular purpose, such as irrigation, power, municipal supply, plant transpiration, or storage.

water disposal system – The complete system for removing excess water from land with minimum erosion. For sloping land, it may include a terrace system, terrace outlet channels, dams, and grassed waterways. For level land, it may include only surface drains or both surface and subsurface drains.

water enrichment – See eutrophication.

water level (stage) recorder – See recording gage; gaging station.

waterlogged – Saturated with water. Soil condition where a high or perched water table is detrimental to plant growth, resulting from over-irrigation, seepage, or inadequate drainage; the replacement of most of the soil air by water.

water management – Application of practices to obtain added benefits from precipitation, water, or water flow in any of a number of areas, such as irrigation, drainage, wildlife and recreation, water supply, watershed management, and water storage in soil for crop production. See irrigation water management; watershed management.

water quality standards – Minimum requirements of purity of water for various uses; for example, water for agricultural use in irrigation systems should not exceed specific levels of sodium bicarbonates, pH, total dissolved salts, etc.

water requirement (plant physiology) – In a strict sense, the ratio of the number of units of water absorbed by the plant during the growing season to the number of units of dry matter produced by the plant during that time. More generally, the amount of water lost through transpiration during the growing season, since the amount retained in the plant is very small compared to the amount evaporated from it. Water requirements vary with plants, climatic conditions, soil fertility, and soil moisture.

water resources – The supply of groundwater and surface water in a given area.

water rights – The legal rights to the use of water. They consist of riparian rights and those acquired by appropriation and prescription. Riparian rights are those rights to use and control water by virtue of ownership of the bank or banks. Appropriated rights are those acquired by an individual to the exclusive use of water, based strictly on priority of appropriation and application of the water to beneficial use and without limitation of the place of use to riparian land. Prescribed rights are those to which legal title is acquired by long possession and use without protest of other parties.

water rights, correlative doctrine – When a source of water does not provide enough for all users, the water is reapportioned proportionately on the basis of prior water rights held by each user.

watershed area – All land and water within the confines of a drainage divide or a water problem area consisting in whole or in part of land needing drainage or irrigation.

watershed lag – Time from center of mass of effective rainfall to peak of hydrograph.

watershed management – Use, regulation, and treatment of water and land resources of a watershed to accomplish stated objectives.

watershed planning – Formulation of a plan to use and treat water and land resources.

watershed protection and flood prevention projects – A system of land treatment or soil conservation practices combined with structural measures installed to improve infiltration and reduce erosion of land within a drainage basin and to protect lands from floods.

waterspreading – The application of water to lands for the purpose of increasing the growth of natural vegetation or to store it in the ground for subsequent withdrawal by pumps for irrigation.

water table – The upper surface of groundwater or that level below which the soil is saturated with water; locus of points in soil water at which the hydraulic pressure is equal to atmospheric pressure.

water table, perched – The surface of a local zone of saturation held above the main body of groundwater by an impermeable layer or stratum, usually clay, and separated from the main body of groundwater by an unsaturated zone.

water use efficiency – Crop production per unit of water used, irrespective of water source, expressed in units of weight per unit of water depth per unit area. This concept of utilization applies to both dryland and irrigated agriculture.

waterway – A natural course or constructed channel for the flow of water. See grassed waterway.

water year – The 12-month period, October 1 through September 30, designated by the calendar year in which it ends (used with streamflow data and analyses). Contrast with climatic year and calendar year.

weathering – The group of processes, such as chemical action of air and rainwater and of plants and bacteria and the mechanical action of changes in temperature, whereby rocks, on exposure to the weather, change in character, decay, and finally crumble.

weed – A plant out of place.

weed tree – An undesirable species of tree that interferes with the development of crop trees.

weep-holes (engineering) – Openings left in retaining walls, aprons, linings, or foundations to permit drainage and reduce pressure.

weir – Device for measuring or regulating the flow of water.

weir notch – The opening in a weir for the passage of water.

well-graded soil (engineering) – A soil or soil material consisting of particles that are well distributed over a wide range in size or diameter. Such a soil's density and bearing properties can normally be easily increased by compaction. Contrast with poorly graded soil.

wetted perimeter – Length of the wetted contact between a liquid and its containing conduit, measured along a plane at right angles to the direction of flow.

wheel-track planting – Plowing and planting in separate operations with the seed planted in the wheel tracks.

wildlife – Undomesticated vertebrate animals, except fish, considered collectively.

wildlife land – Land managed or used primarily for wildlife.

wildlife management – The art of producing sustained annual crops of wildlife.

wildling – A seedling or young plant naturally reproduced outside a nursery and dug for use as planting stock.

wilting coefficient – See wilting point.

wilting point (or permanent wilting point) – The water content of soil on an oven-dry basis at which plants, specifically sunflower plants, wilt and fail to recover their turgidity when placed in a dark humid atmosphere. The percentage of water at the wilting point approximates the minimum water content in soils under plants in the field at depths below the effects of surface evaporation. It is approximated by the moisture content at 15-bar tension.

windbreak – 1: A living barrier of trees or combination of trees and shrubs located adjacent to farm or ranch headquarters and designed to protect the area from cold or hot winds and drifting snow. Also headquarters and livestock windbreaks. 2: A narrow barrier of living trees or combination of trees and shrubs, usually from one to five rows, established within or around a field for the protection of land and crops. May also consist of narrow strips of annual crops, such as corn or sorghum.

wind erosion – The detachment and transportation of soil by wind.

wind erosion equation – An equation used for the design of wind erosion control systems. $E = f\ (IKCLV)$ wherein E = average annual soil loss, expressed in tons per acre per year; f = a function of; I = soil erodibility; K = soil ridge roughness; C = climatic factor; L = unsheltered distance across the field along the wind erosion direction; and V = vegetative cover.

wind stripcropping – The production of crops in relatively narrow strips placed perpendicular to the direction of prevailing winds.

wing wall – Side walls of a structure used to prevent sloughing of banks or channels and to direct and confine overfall.

winter irrigation – The irrigation of lands between growing seasons in order to store water in the soil for subsequent use by plants.

wolf tree – A term applied to broad-crowned, short-stemmed trees, usually a large, limby tree that has had more than adequate growing space.

woodland – Any land used primarily for growing trees and shrubs. Woodland includes, in addition to what is ordinarily termed "forest" or "forest plantations," shelterbelts, windbreaks, wide hedgerows containing woodland species for wildlife food or cover, stream and other banks with woodland cover, etc. It also includes farmland and other lands on cover, etc. It also includes farmland and other lands on which woody vegetation is to be established and maintained.

woodland management – The management of woodlands and plantations that have passed the establishment stage, including all measures designed to improve the quality and quantity of woodland growing stock and to maintain litter and herbaceous ground cover for soil, water, and other resource conservation. Some of these measures are planting, improvement cutting, thinning, pruning, slash disposal, and protection from fire and grazing.

woodland suitability groups of soils – A woodland suitability group is made up of kinds of soil that are capable of producing similar kinds of wood crops, that need similar management to produce these crops when the existing vegetation is similar, and that have about the same potential productivity.

woodland weeding – The elimination or control of undesirable weeds, vines, shrubs, or trees of poor form or less desirable or inferior species to improve the growth of desirable species.

xerophyte – A plant capable of surviving periods of prolonged moisture deficiency.

Zingg bench terrace – A special type of bench terrace designed for dryland moisture conservation. It employes an earthen embankment similar to the ridge terrace; a part of the terrace interval immediately above the ridge is bench leveled. Runoff water from the sloping area is retained on the leveled area and absorbed by the soil. See terrace.

zone of aeration – Subsurface zone above the water table in which the soil or permeable rock is not saturated.

zoning (rural) – A means by which governmental authority is used to promote the proper use of land under certain circumstances. This power traditionally resides in the state, and the power to regulate land uses by zoning is usually delegated to minor units of government, such as town, municipalities, and counties, through an enabling act that specifies powers granted and the conditions under which these are to be exercised.

zoning ordinance – The exercise of police power for the purpose of carrying out the land use plan of an area. It may also include regulations to effect control of the size and height of buildings, population density, and use of buildings, for example, residential, commercial, industrial, etc.